THE RUBBER AGE

ESTABLISHED 1917

COVERS ALL PHASES OF THE PRODUCTION AND MARKETING OF CRUDE RUBBER AND THE MANUFACTURE AND DISTRIBUTION OF RUBBER GOODS

Vol. 36 MARCH, 1935 No. 6

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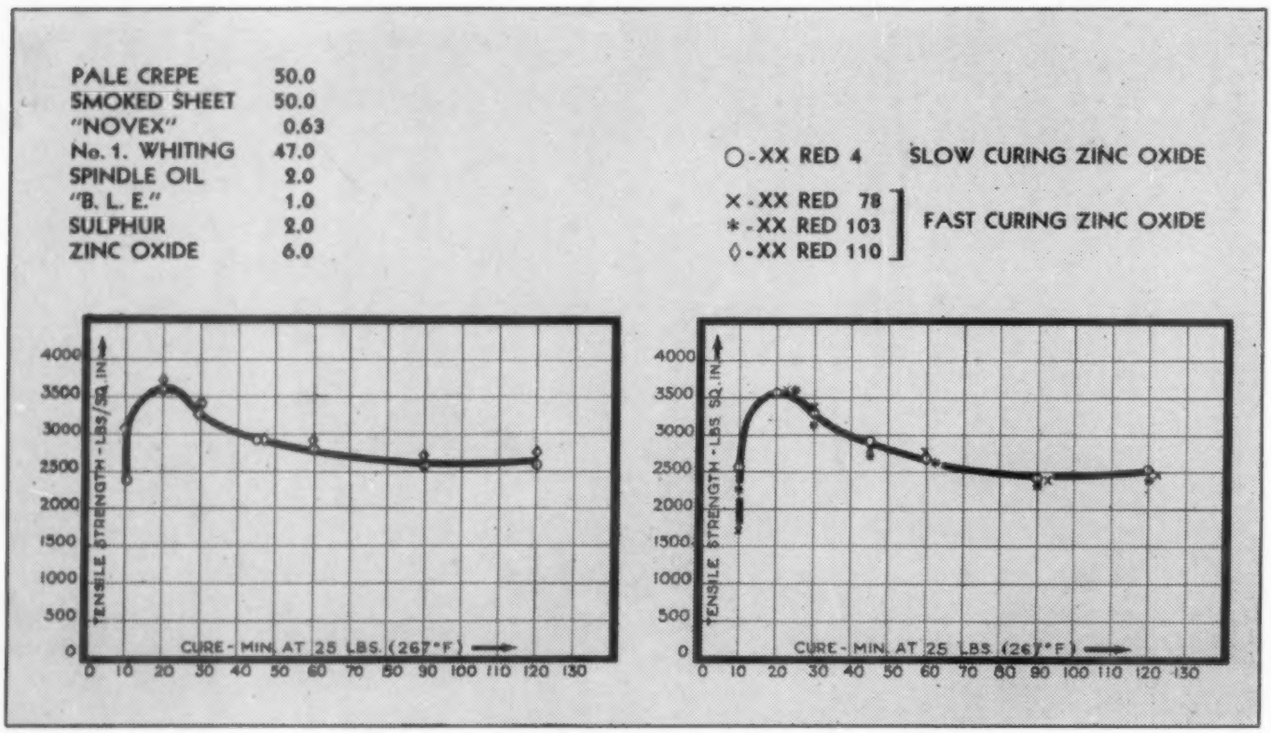
"Fast" and "Slow" Curing Zinc Oxides in the Activation of "Novex"


PALE CREPE 50.0
SMOKED SHEET 50.0
"NOVEX" 0.63
No. 1. WHITING 47.0
SPINDLE OIL 2.0
"B. L. E." 1.0
SULPHUR 2.0
ZINC OXIDE 6.0
○-XX RED 4 SLOW CURING ZINC OXIDE
×-XX RED 78
*-XX RED 103
◊-XX RED 110
FAST CURING ZINC OXIDE
TENSILE STRENGTH - LBS/SQ. IN.
CURE - MIN. AT 25 LBS. (267°F)
0 10 20 30 40 50 60 70 80 90 100 110 120 130
0 500 1000 1500 2000 2500 3000 3500 4000

No. 36 of a series of charts showing a comparison of "FAST" and "SLOW" curing zinc oxides with typical accelerators.

• Practically no differences are noted between several types of zinc oxide in the activation of "Novex" when the curing temperature is 267° F.

NOTE: the data for charts No. 1 and No. 2 were obtained on different dates and on duplicate mixings.

New Jersey Zinc

THE NEW JERSEY ZINC COMPANY 160 FRONT STREET NEW YORK

THE RUBBER AGE

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Engineering Uses of Rubber

By Curt Saurer,

Mechanical Rubber Goods Division, Firestone Tire & Rubber Co.

WITHOUT rubber tires the development of the automobile would have been handicapped and might not have been possible at all. Considering the acceleration and deceleration of automobiles, the road surfaces over which tires have to travel, the continual scuffing on the road, the tremendous power transmitted by them, their performance today is certainly cause for marvel. Since only rubber would stand so much abuse, inventors and designers have recently employed it for many other automotive purposes than road contact. Rubber parts are now very important in automobile construction.

The rubber parts as used today in an automobile can be classified into two groups. They have either been purposely designed to perform certain functions or installed as an after-thought to reduce or eliminate noise and vibration, compensate for variations in construction, absorb shocks, or perform some other insulating function.

We will discuss briefly a number of automotive rubber parts and their functions and then go into the problems of deadening or eliminating noise and vibration.

We have already mentioned tires. The next point of insulation if we work from the tire up into the chassis would be wheel. Many resilient wheels employing rubber have been designed, but none of them are used in production, largely because their weight and the mechanical difficulties in assembling such wheels are such that economical construction is not possible at the present time. It does not seem unreasonable to me, however, that a rubber-insulated wheel could be invented to perform satisfactorily on a car and overcome the disadvantages resulting from recent mechanical automotive developments. Experimental insulated wheels on rail cars have proved successful and there is no reason why some of the principles developed on these wheels could not be adapted to automobiles.

The next point where rubber insulation is used is between the axle and the springs. Various designs for these parts have been made up during the years, and some of them are used in production today. Decidedly beneficial results are obtained by insulating the axle from conventional springs and also by insulating parts acting as axles, in individual sprung cars. In many cases wandering of the cars on the road has been eliminated by using axle insulation either in the front or rear, or both.

A great many rubber devices have been designed for spring ends, belflex shackles, and shock insulators. It is essential, however, that a sufficient amount of rubber be used to take care of the loads and movements. Most of the bushing type shackles have failed or are not used in standard production any more because the amount of rubber used was not sufficient to take care of the work imposed on shackles. In several shackles of the bushing type, not enough stability sideways was provided to make the assembly successful.

A shackle that overcomes the above mentioned defects is the Harris type shackle. It is used by many manufacturers and shown in the illustration herewith. This is just an illustration showing a sufficient amount of rubber to do a certain amount of work, whereas, in most other devices the rubber had been cut down below a minimum and failure of some sort was always the result.

The simplicity and economy of application, together with a large volume of rubber, which can be increased for increasing radial movements and the ability to absorb axle and road noises have made this the outstanding rubber shackle device today. It can naturally be applied for other connections than spring shackles.

A device which can be classed under the rubber shackle group is a torque rod end, which has been specially designed to accomplish several specific functions. The tests and service lead us to believe that this part will outwear the truck itself. The loads on the rubber run as high as 10,000 per square inch occasionally, without any ill effects.

In individual sprung cars bushing type shackles of some kind or another will be used in the future as they have decided advantages over mechanical assemblies. Rigidity is a prime requirement in some of these bushings in the horizontal axis, however, greater rotational flexibility will be required of some of these devices.

A number of specially designed rubber bumpers are used on individual sprung cars to help out the coil springs and obtain additional stability for these cars on the road.

This paper was presented before the Society of Automotive Engineers on January 14, 1935, at the Book-Cadillac Hotel, Detroit and is reproduced by permission of the S.A.E.

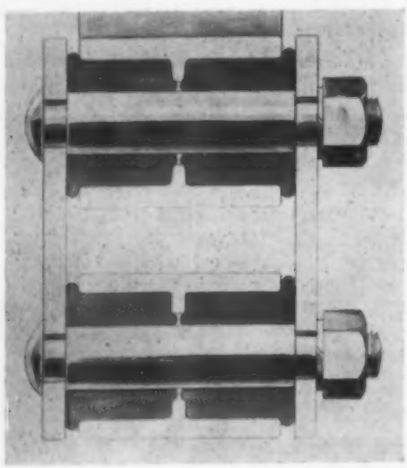
These bumpers might at some future date be increased in size to a point where they will replace a steel spring device entirely. We have conducted tests with all-rubber springs that were satisfactory and very encouraging and further work is being done on this today.

It has proved very beneficial to place a rubber device between the running gear and the motor to reduce axle and gear box noises. A device of this nature might be a torque joint, a rubber universal joint or an insulated drive shaft. While only a very few of the manufacturers use any of these parts today, we feel sure that they will be standard on almost any car in the next few years. Of all the rubber universal joint designs, one finally has proved successful, inasmuch as it is capable of taking care of the torque, does not heat up under severe conditions, and holds the drive shaft in the center at all times.

It is my opinion that very shortly most of the manufacturers will be forced to adapt a silencing device to cushion their drive between gear box and wheels, and for this reason I would like to dwell for a short time on the features of a rubber universal joint.

The device itself is very simple. There are four specially built trunnion blocks that are attached to companion flanges with radially opposite attachment points. The driving and the driven companion flanges are at right angles to each other. Two stampings with corresponding pockets hold the rubber blocks in place and you will note that this design creates only half the angularity in the rubber blocks than is imposed on the drive shaft. By necessity this design becomes a constant drive universal joint providing a cushion drive and taking care of elongation and misalignment of the shafts.

The design and proportions of the blocks are such that heat generated during operation is radiated to the surface. The fan action of the design itself is a further help in dissipating the heat and for this reason it is the only rubber universal joint that I know of that does not heat up under the most severe operation. Of course, the proper size of a joint will have to be applied to each job to carry the load. Continuous over loading on a size too small to do the job would undoubtedly result in failure. The rubber blocks are bonded on the outside to fabric and on the inside diameter to a special woven metal screen. The rubber compound has been specially developed to take care of rapid changing movements, has a minimum of permanent set and low cold flow.

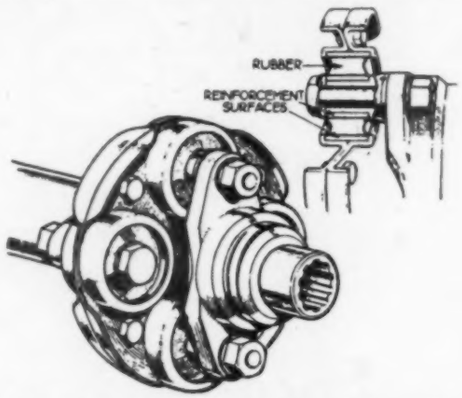


Rubber shackles with large rubber volume and sideway stability used by many automobile manufacturers.

The companies that have used this joint in production are entirely satisfied with the performance and as far as I was able to find out have not as yet replaced one single unit in one and one-half years time of operation. This shows us that if rubber is used in a design that eliminates friction and heat, it will work indefinitely.

It is needless to say that this joint does not require any upkeep and is absolutely silent. The features are so many that it is my prediction that this device will be incorporated in the majority of cars in the next year.

Next are the brakes. Rubber plays an important part in braking systems, being used in grommets, boots, brake rod insulators, anti-rattle devices, pistons and hose in hydraulic braking systems. All of them perform their functions very well. Practically all brake linings today use a rubber compound as a binding material. It is possible to vary the rubber compound to produce different frictional values almost at will. With this in mind brake linings today can be designed as a complement to the brake, instead of designing the brake to suit the lining. Careful choice of rubber compounds and construction of the lining have raised the life of brake lining beyond where it was when free-wheeling was introduced.



Constant drive rubber universal joint which provides a cushion drive and takes care of elongation of the shafts.

Brake and clutch pedal pads are used in different forms to prevent slipping of the foot on worn or polished metal surfaces. Air seals are very often used on these pedals to provide floor board insulation, prevent rattles and keep out undesirable fumes from the motor. This is one example of a piece that certainly accomplishes a multitude of functions, and we strongly recommend that every car should be equipped with same.

In many cars here and abroad steering connections are rubberized. Different types of rubber insulation are on the market, all of them working satisfactorily in taking up small vibrations and helping in a better performance and easier steering of the car. Of course, most of the steering columns themselves are insulated from the dashboard or body with grommets, rubber bushings, or sleeves of some nature.

Hardly an automobile is built today that does not make use of rubber in the form of insulation between the motor and the frame. We have heard many papers in the Society on motor mountings, their proper location and flexibility, and we will, therefore, not go into details on this subject. We would only like to mention here that it is not very essential that motor supports be located at a very definite point in relation to the distribution of weight or the center of gravity and that the same results can be obtained by relocation of the supports and proper design.

Motor supports of the future must have a decidedly slower vibration time and also a slower dampening action. This will involve new designs that will be more costly and for this reason have not been taken up with the different automobile companies at present. The present trend of buying is still to pay as little as possible for a piece that is a necessary evil.

Crank shaft vibration dampeners might be of a friction type or rubber dampeners of some kind that are not as yet

used in as many cars as we would like to see them on. Automobiles that do not have them seem to be in urgent need of them and could be greatly improved as to smoothness and elimination of vibration. Because of the cost of this device on a car this vibration dampener has not been included in many motors. The rubber is a very small part of the total expenditure, however, as the balancing weight and other steel parts are much more costly.

While discussing motor rubber parts, we might mention radiator hose, which can be built to accomplish other functions than just to transmit the water from the motor or vice versa. For example: a hose that has a water outlet or water drain built into it. This can be used either as a drain or hot-water heater attachment. Many pieces must be made in snake-like forms to go around various parts, as they would otherwise interfere with assembly or accessibility.

A fan belt is a motor part of which present day engineers expect too much. Only so much strength can be built into one belt. To transmit constant loads of over 8 horsepower with a cross section of only about ¼ square inch and flexing 60 times per second, is a big demand to be placed on a belt. The belt can only be strengthened at one particular height between the bottom and the top of the belt, and the rest must remain flexible in order not to separate from the strengthening elements. I am not able to give you accurate figures on how the pulley size affects the belt life, but I believe that for every inch increase in diameter in the pulley we can add approximately 50% of belt life. It makes a tremendous difference whether the belt is flexed over a short radius or a long radius. The heat generated in the belt is proportionally smaller as the pulley size increases.

Many of the manufacturers have introduced a new type of fan belt known as "No Stretch Belt." This belt is so constructed that all the stretch is taken out of the fabric before the belt is built. There is something new and different in the application of this belt inasmuch as it should not be applied with too much initial tension, for any elongation of the belt will be due only to wear on the side. This belt can be run under reasonable conditions from 15,000 to 20,000 miles before a readjustment of the belt tension has to be made. This new construction will allow engineers to design fan belt layouts with a minimum of tension take-up.

Other parts which require rubber as an integral part and as sealing devices, are the ignition cables and other electrical wiring. These are products which have, in later years, been perfected to a point where they are trouble-free almost without exception, for the life of the car. A great many rubber-insulated wires have been further improved by new coverings and rubber-insulated terminals.

There are so many rubber body parts that we will not take the time to go into details on many of them. Among these are all the window insulations, bumpers, air seals, door stops, matting and cushions. In my opinion, insufficient attention has been paid to the insulation between the body and chassis frame. There are only two ways I can see that this connection should be made. Either a perfectly solid connection should be made, in which case no rubber will be required, or if it is insulated it should be well insulated with a design to absorb small vibrations, take up variations in manufacturing tolerances and on the other hand be rigid enough to prevent any horizontal movement.

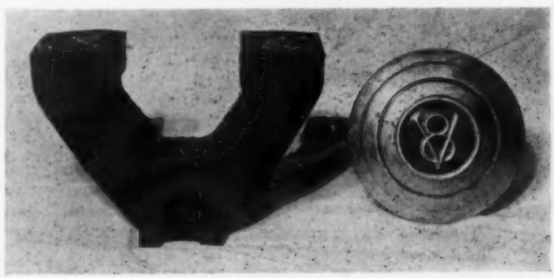
Many experiments are being carried on in combinations of rubber materials or rubberized materials for seat cushions, arm rests or panel insulation. In England sponge rubber seat cushions of certain designs are commonly used. We have experimented in the United States with similar cushions of a possibly improved design, but have not been able to reduce their weight successfully down to that of the present spring cushions. This has been one of the most severe handicaps in the progress of this material, as probably the price and the performance are equal, over advantages still inherent in the steel spring cushion.

It is possible that a combination of sponge rubber and rubberized spun hair will make satisfactory seats and help somewhat in the reduction in weight. It also seems possible to me that decided improvements could be made in the stability of the spun hair cushions to make an acceptable production item for the body manufacturers.

Inside the bodies many more parts could be made out of hard rubber, as the color combinations and finishes obtainable in this product make it suitable for obtaining the desired appearance. We have steering wheels in various designs but I am sure that the appearance could be improved further to harmonize with the trimming finish. Hard-rubber-covered door handles have practically disappeared from cars. In this instance the cost was the deciding factor.

The running boards are very important automobile parts which might be classed under the body parts. They not only prevent slippage in getting in and out of the car but they have many other features that do not seem to be apparent at first thought. A rubber-covered running board is a big factor in eliminating road noises, preventing the finish of the car from being scratched, or acting as a gravel deflector, and is also a decided improvement to the appearance of the car. It lengthens the lines of the body and puts a finishing touch on the entire appearance of the automobile between the body and the ground. The possibilities of further improving the design of this vital part on the automobile are many. The color combinations might be worked out to harmonize better with the body or the trimming of the body. Metal inserts might be used to break the long lines if so desired.

Just as important as running boards, as far as road noise elimination is concerned, are fender liners. I believe that on the higher priced car this item will have to



Experimental all-rubber spring suggested for automobile use. The size is shown in comparison with an ordinary wheel hub cap.

be included as a standard necessity. It might be made out of a sheet of rubber applied on the under side of the fender or might be in the form of a cement which is painted on in a heavy coat. This not only eliminates noise but it prevents the fenders from being dented by flying gravel.

Rubber fenders for passenger cars are economically unsound and would add to the weight of the car. Steel inserts would be required for reinforcing and attaching means and while they are the dream of many drivers, I do not believe that we will ever see fenders made entirely of rubber on passenger cars. On buses, however, rubber fenders are practical and have become almost a standard article. Only a small section of the fender protrudes. This can be manufactured economically and the weight, not being such an important factor in this case, does not greatly add to the weight of fenders applied on wheel housings. It is also possible to apply a standard fender on wheel housings with slightly different radii, as the rub-

ber can be stretched in shape and applied to make a perfectly satisfactory job.

In the second part of the paper we will discuss some of the engineering principles of rubber. Should we be called on to design a rubber device with definite specifications I believe we could do so in every instance providing we are allowed the necessary room to install this device on an automobile. But as mentioned in the early part of this paper, most of the devices we put into automobiles are afterthoughts and almost invariably we are cramped for space to put in a suitable product from the rubber manufacturer's standpoint.

Very often a rubber device in an automobile could be improved, as in most cases we have to compromise between cost, available space and performance. The results of such designs are invariably unsatisfactory from a rubber engineer's standpoint.

Rubber has such a variety of qualities that it is difficult to make a general statement as to its elasticity, tensile strength and hysteresis. The differences in rubber compounds and their varying physical properties are the reason we do not find any data on them in engineering hand books. In the first place, we have to remember that rubber is a product grown around the equator in many different countries and under many different conditions. In the rubber factories it is compounded with many different ingredients to obtain desirable characteristics such as resistance to abrasion, resistance to chemical action, increase or decrease in flexibility, heat or cold resistance, definite hysteresis loss, and combinations of these properties to make it function with fabrics or steel. The range of hardness alone, ranging from a sponge rubber to a very hard rubber would necessitate at least 50 different compounds, each one acting differently under distortion.

Hardness naturally influences the flexibility of rubber to a great extent.

Elasticity is probably the most desirable quality we find in rubber compounds. By elasticity we understand that property of a body, by virtue of which it tends to return to its original shape and dimension when the distorting forces have been removed (quoted from Alpheus W. Smith, "The Elements of Physics"). We all know that for practical purposes rubber will return to its original shape, if not over-stressed or over-worked. As a general rule we can stress rubber continually for 25% of its breaking elongation.

The elasticity varies greatly if fabric inserts are used in a rubber device or if the rubber is vulcanized to steel plates. When we stress rubber we perform work upon it.

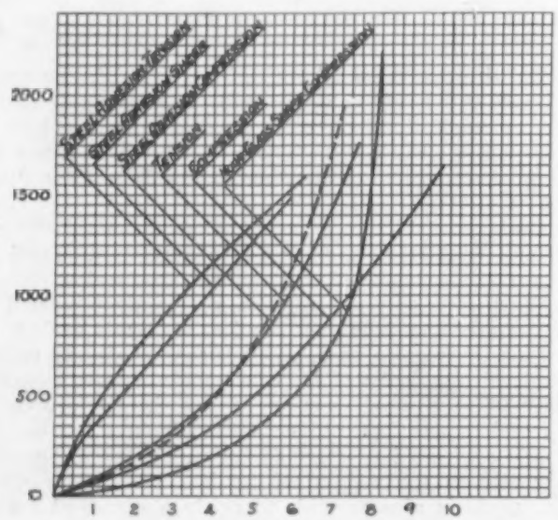


Chart I

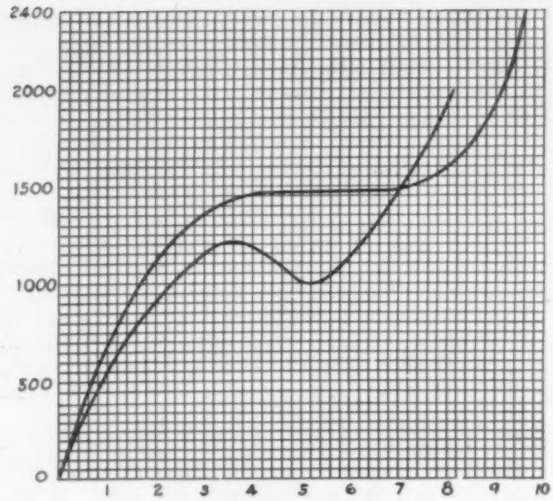


Chart II

This work must either be transmitted or else absorbed by the rubber part. All work not transmitted must be absorbed; that is done by turning it into heat. This heat will either be radiated or increase the temperature of the rubber part. If the work absorbed by a part is of such magnitude that the heat cannot be radiated, the part will eventually fail, as a result of melting of the rubber.

Another factor which influences the radiating ability of a rubber part is the thermal conductivity of the part itself. That is, the part must carry the heat generated in its center to its surface before it can radiate it. For this reason, I doubt very much whether an automobile rubber valve spring, even if we could cool it properly, would work successfully, because of the low thermal conductivity of our present rubber stocks used in this part.

Summed up in a few words, our limitations are imposed only by the efficiency and the thermal conductivity of the rubber part. It is impossible to state in definite figures just what heat any compound will withstand, since working conditions are not standard. Every rubber part must be designed for the job it is to do.

The tensile strength is a factor which varies, for different compounds, between 100 and 6,000 pounds per square inch. In automobile constructions we have not found much use for direct tension applications of rubber products.

By making use of different compounds and the variety of qualities of these in combination with different shapes of the rubber parts themselves, and fabric or steel adhesion, we have been able to develop deflection curves which cannot be duplicated by steel springs unless they involve a large mechanism. For instance, if we take an hourglass shape rubber block and compress it, we obtain a deflection curve which is very flat at the beginning, then gradually increases and at one particular part in the curve starts to increase to almost a vertical line.

In chart No. 1 we show stress strain diagrams of rubber in tension, shear and compression with and without the use of rubber to steel adhesion.

Straight rubber blocks if used in tension, compression or shear almost invariably show a characteristic rubber deflection curve which is concave to the stress axis. The modulus of stiffness increases as the stress increases. We will notice a similarity of these curves shown in Chart No. 1, in one particular range. By varying the cross section and the hardness of the rubber we are almost invariably able to develop a particular deflection curve desired in tension, shear or compression. You will notice in Chart No.

(Continued on page 295)

Advantages of Better Lighting

Recent Developments Prove That Good Illumination Lowers Costs, Increases Efficiency and Production

By L. A. S. Wood

Manager, Lighting Division, Westinghouse Elec. & Mfg. Co.

BECAUSE better illumination does cut costs, increase efficiency, reduce accidents and establish better working conditions, lighting in industrial plants everywhere will probably be revolutionized in the next few years. At present industrial lighting averages less than 5 footcandles, one survey of 2000 industrial plants even averaging below 3, as compared with the safe minimum of 10 footcandles. Industry is awakening to advantages of better lighting as a result of recent developments in lighting and many industrial lighting surveys. The following are only a few examples of many instances where proper illumination definitely increased production.

In the rubber industry an example is furnished in the mechanical rubber goods department of the Firestone Tire & Rubber Company at Akron, Ohio. The Firestone company has been improving lighting throughout the business period when expenditures were greatly curtailed. An increase of 1 per cent in the efficiency of each employe would mean a large saving to the company. The lighting installation in this plant, which incorporates the use of Westinghouse Glassteel Diffusers and Safechange Hangers, successfully handled the problem and furnished ample illumination. The Firestone officials know from experience that good lighting increases efficiency and promotes safety.

One of the most conclusive proofs that good lighting pays its cost is furnished by a national piston company. This plant was inadequately lighted and the local power company induced them to make a lighting test. The president reports that at the beginning of the test the plant was running at about 70 per cent capacity with a lighting intensity of 1.2 footcandles. In one department the lighting was stepped up to 6½ footcandles and production increased 13 per cent. Then it was further increased to 9 foot-candles and an additional 4.9 per cent increase was obtained. Finally the lighting was increased to 14 footcandles and production jumped another 6.9 per cent. In all, the lighting of 14 footcandle intensity increased production 25.8 per cent over the old installation.

In the inspection department of a large roller-bearing manufacturer a thorough test of the effectiveness of light in increased production was made. The original system of lighting provided 5 footcandles at the inspection table. The number of pieces inspected per hour per operator was 408. When the new lighting installation providing 20 footcandles was in operation, production jumped to 458 pieces per hour per operator—an increase of 12½ per cent. This intensity was maintained for two weeks, then decreased to 13 footcandles, and immediately production dropped to 440 pieces per hour per operator. When it was later set back to 20 footcandles production increased to its peak.

General view of the lighting system in the mechanical rubber goods department in the Akron plant of the Firestone Tire & Rubber Company. An engineer is seen checking the light intensity with a light meter.

In a hosiery plant proper illumination was installed and immediately production of knitting machines jumped 10.8 per cent and of looping machines 6.1 per cent. The cost of the installation was only four-tenths of one per cent and the operating cost one-tenth per cent of the yearly payroll.

In the composing room of a large register company the lighting was old-fashioned, inadequate and spotty. Men at work setting type were slow and errors were common. The management consulted a lighting specialist and he recommended an entirely new system with modern equipment and Mazda lamps of proper size. After the new installation was made a careful check was kept; production increased 6 per cent and only 20 cents per day was added to the light bill.

In a plant operating a battery of wire drawing machines a haphazard system of drop cord lighting was replaced with a scientifically planned overhead system. Immediately the output of the machines was increased 21 per cent.

A manufacturer of automobile parts reports that after installing a new lighting system which increased lighting intensity 133 per cent, labor turnover dropped from 6.37 per cent per month to 2.78 per cent per month. In addition, work was speeded up enough to completely pay for the installation in 18 months.

The development of the light meter which is a portable compact means of measuring lighting intensities, makes it possible to easily and accurately check the intensity of light provided by artificial illumination in industrial plants everywhere. Illumination research laboratories have discovered by actual test that wherever eyes are used for work that 10 footcandles is an absolute minimum. Further tests have also revealed that working under intensities less than 10 footcandles causes not only severe eye strain but results in fatigue, sleepiness, nervousness, headaches, indigestion, etc. Glare from light sources in the line of vision, reflections from glossy surfaces and uneven distribution of light are also features which contribute to this condition.

As a general promise to a new lighting approach to industry, Westinghouse is making three definite recommendations: (1) increase intensities, (2) abolish glare, (3) provide uniform distribution.

Adequate lighting is a working tool in any plant. The importance is best summed up in an adaptation of a well known adage "As a man sees, so does he work."

Industry has spent tens of thousands of dollars in developing machines of greater efficiency, but the most delicate machine is not half as sensitive as the operator. And when conditions are such that it is difficult to see, when surroundings are dark and gloomy, operators cannot be expected to get the most out of machines. Production suffers. Costs increase. Accidents increase.

Other important considerations are the new industrial codes under which industry is working. Shorter work days and shorter work weeks have necessitated the addition of more shifts and the employment of more men. Better illumination enables employers to get a greater volume of work and greater accuracy from each employe under the shorter hours and perhaps increased pay.

But not only does better lighting mean increased production, it also means better work. Employees can see better, but equally important they have a more inviting, improved working condition and plant atmosphere. A dark, gloomy plant is depressing to workers and they cannot be expected to do their best in surroundings of this character. Better light will increase the morale of the entire staff to a pitch which assures good work, high efficiency. Also, workers are more dependable in well-lighted plants, and more satisfied to stay on the job—therefore, labor turnover is substantially reduced.

Another important advantage of modern lighting in industry is that it makes all space available for active production. With spotty and inadequate illumination there is a large percentage of modern plant floor area which is dark and useless for actual production. The machinery and production line must be grouped close to existing lighting units, leaving large areas which are useful only for storage purposes, etc. These areas can be transformed immediately through installation of modern lighting to useful productive activity. Machinery can be arranged for efficient production, and in many cases more machinery and men can be employed in a given plant area. Also, in a plant where dark corners and out-of-the-way spots exist, there exists the opportunity for workmen to seek these spots for idle, unproductive moments.

Improved lighting also means decreased accidents. Workmen who can see danger rather than merely sense it are less likely to be involved in accidents. And accidents in addition to their regrettable nature cost industries large sums of money year after year.

One of the most interesting descriptions of the relationship between lighting and accidents is found in the Code of Lighting prepared under the direction of the Illuminating Engineering Society.

This report points out that the National Safety Council estimates that the number of fatalities in the United States arising out of or in the course of gainful employment was 24,000 for the year 1928, and that during the same period the lost time non-fatal accidents reached the staggering total of 3,125,000. The report also points out that a prominent insurance company admit a warrant for assuming that defective vision and deficient or unsatisfactory lighting installations are contributing factors of 18 per cent of these accidents. This means that from these causes industries are being deprived of the equivalent of the services of 35,000 men throughout each entire year due to lost time non-fatal accidents. This is indeed a high price to pay for neglect of light and vision.

Quoting further from this report it is discovered how from a dollars and cents standpoint accidents cost industry thousands of dollars a year.

"Compensation insurance premiums for a plant are

(Continued on page 296)

"An Accident Every 46 Seconds"

Improper use of artificial light caused an occupational accident every 46 seconds and a fatal accident every hour in America last year, according to D. W. Atwater, of the Westinghouse Lamp Company, and General Secretary of the Illuminating Engineering Society.

Of the 1,269,500 occupational accidents (persons gainfully employed at time of accident) recorded for the entire United States last year, 15% were traceable to poor lighting, based on statistics of the National Safety Council.

Employers in the entire nation paid a total of $550,000,000 for all occupational accidents in 1933, of which $420,000,000 represented wage losses, $40,000,000 the medical expense and $90,000,000 the insurance costs. About $200,000,000 of this total sum could have been saved through the use of correct lighting, according to Mr. Atwater's estimate.

For every dollar paid out by insurance companies in compensation claims for occupational accidents, the employer must pay four dollars for hidden or indirect costs!

While carelessness can be blamed for some of these accidents, inadequate lighting is responsible for many others.

A 30-foot streamlined Chris-Craft cruiser powered with a 55 h.p. rubber mounted motor.

Rubber in Motor Boats

By M. E. Lerner

THE recent National Motor Boat Show, held in the Grand Central Palace, New York City, the thirtieth annual exposition of this event, brought out the fact that the number of motor boats and small pleasure craft in this country continues to increase each year. There was a gain of 7,586 numbered motor boats used on Federal waterways throughout the United States during the first six months of 1934 alone. The show, in which 90 different models were exhibited, ranging from tiny tenders to an Elco 48 foot yacht, also brought out the fact that rubber is playing a continuously major role in the better functioning of the modern water carrier.

The use of rubber parts in connection with new boat models varies widely depending upon the manufacturer. For instance: the Richardson Boat Company, Inc., North Tonawanda, N. Y., advises that "about the only rubber we use is matting on stair steps and a gasket under the stuffing box" in the cruisers it manufactures. This applies only to the boats, themselves, and not to the motors which we discuss further along. On the other hand the Chris-Craft Corporation of Algonac, Michigan, makers of the famous Chris-Craft speed boats, makes liberal use of rubber floor mats in all open models, and uses rubber on the cock pits and step guards of closed boats to protect the surface finish when people step in or out. Other uses in boats of this manufacture include rubber lined hose, cock pit rolls, rubber window strips, and rubber stern bearings, the latter on special order only.

The 1935 Chris-Craft models also make use of a new method, developed by the company's engineering department, of window mounting. This method consists of using a bead of rubber completely around the window frame by adding a pressure clamp to the window and sill, thus making an absolutely water tight joint when closed.

Within the past few years rubber bearings have become standard equipment on practically all motor boat and cruiser models. Minimum wear and maximum life is, of course, desirable for propeller shaft bearings which are subjected to a high degree of friction. Since water is the lubricant, the answer was found several years ago in bearings using soft rubber. The B. F. Goodrich Company, Akron, pioneered in this respect with a complete line of "Goodrich Cutless Bearings" which are nationally distributed by Lucian Q. Moffitt, Inc., of Akron.

The Goodrich bearings for water craft consist of a metal sleeve lined with tough resilient rubber similar in texture to a good automobile tire tread. To offer the minimum of friction they are made with rounded faces, rather than the gripping tread used in automobile tires. These bearings permit the shaft to spin freely without vibration to the power plant. In addition to practically eliminating heavy vibration, rubber bearings of this type also are of aid in increasing speed and add to safety since a shaft cannot seize in them.

There are still other advantageous points in the use of "cutless bearings," according to Moffitt, Inc. For instance: 90% of bearing and shaft wear is caused by the fine sand and grit carried in suspension in nearly all water; cutting and scoring is inevitable when a hard, sharp particle works in between a hard bearing surface and the shaft; but when sand and grit enters the lubricating water stream of rubber bearings it cannot score the shaft or scratch the bearing since the rubber depresses, giving way sufficiently to allow the foreign matter to be rolled into the grooves provided for that purpose, and then be washed away.

Goodrich Cutless Bearings are major equipment on motor boat and cruiser models produced by the American Car & Foundry Company, Huckins Yacht Corp., Marblehead Boat Corp., Henry C. Grebe & Co., Inc., Seaman Sea Skiff Works, Vineyard Ship Building Co., Higgins Industries, Inc., Century Boat Co., Dodge Boat & Plane Corp., Hacker Boat Co., and other manufacturers.

Rubber plays a still more important role in boat engines. Almost every modern engine is mounted in rubber. Models using rubber mounted engines include those produced by Chris-Craft, Elco, A. C. F., Gar Wood, and others. Some of the boat manufacturers build motors of their own construction, but generally motors are supplied for inclusion in the finished model.

All of the 1935 Elco models, which include eleven complete standardized cruisers ranging in size from 28 to 60 feet, include the Elco suspension type rubber mountings in the engines. These specially developed mountings, introduced by the company last year, are said to be entirely different from that usually supplied as it suspends the entire engine assembly, including the foundations, in large live rubber pads, thus isolating from the hull most of the vibration set up by the engine. The weight of the engine is carried on heavy fore and aft double planked cross bulkheads, which also serve as important strength members to

the hull. Use of rubber engine mountings has added enormously to the pleasure of cruising because of their importance in reducing boat vibration to practically a minimum.

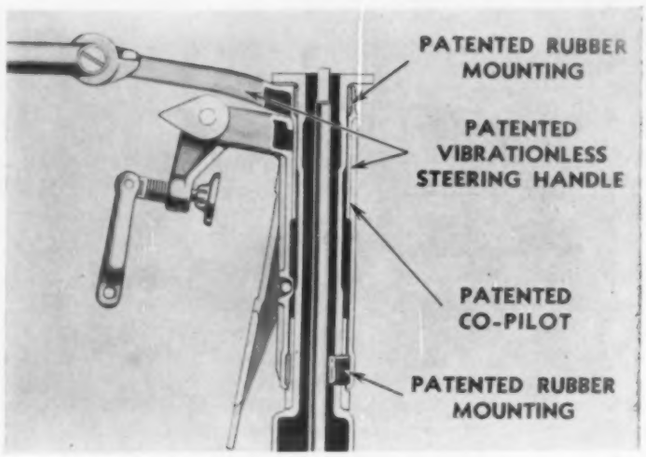
Outboard motors, too, take advantage of rubber for improved functioning and better performance as exemplified by two of the leading manufacturers, i.e., the Outboard Motor Corporation, Milwaukee, Wisconsin, and the Johnson Motor Company, Waukegan, Illinois. The Standard Lightwin and the Lightwin Imperial, two models of the Outboard Motors Corporation, are described as having motors "floated-in-rubber." Rubber mountings encase the drive shaft housing at top and bottom. They are long-lasting since they are subject to little wear and are fully protected from sun, moisture and oil. Another important feature on these models is a rubber cushioned propeller, an Evinrude-Elto development that is said to reduce the nuisance of shear pin replacements to practically nothing. When the propeller strikes an obstruction the rubber cushioning on it permits a flexing movement as high as 90 degrees. A smoother ride is thus maintained. The shear pin replacement nuisance is eliminated because the rubber bushing acts as a shock absorber when obstructions are encountered.

A patented "co-pilot," mounted in rubber, introduced a few years back, continues to be a popular item on outboard motors. This "co-pilot," a triple device, takes hold of the tiller when the driver removes his hand, automatically keeping the boat on a straight course. This device, part of the vibrationless steering handle system, also mounted in rubber, is standard equipment on most modern outboard motors.

The Sportsman model featured by the Outboard Motors Corporation is equipped with a Flexo-Rubber steering handle. Other models make use of rubber shock-absorbing and vibrationless handles, including the Weedless Fisherman and Lightwin models. These rubber-cov-

The "Sportsman" outboard motor featured by the Outboard Motors Corporation is equipped with a Flexo Rubber steering handle for convenient control.

ered handles make steering simpler because of easy movements made possible. Practically all Evinrude-Elto types of outboard motors thus take advantage of the properties of rubber in some form or another. The complete line ranges from a 38-pound midget motor to the *Four-Sixty*, the latter said to be capable of reaching more than 60 m.p.h.



This illustration shows rubber mountings encasing drive shaft housing at top and bottom as employed in Lightwin outboard motors produced by Outboard Motors Corp.

Outboard motor models produced by the Johnson Motor Company, producers of the Sea Horse line, also make use of rubber in various applications. One of the 1935 models, the Aero-Built Sea Horse 300, includes the patented "co-pilot" described above, rubber-covered steering handle, rubber mountings, etc.

The application of the tire principle to water craft is exemplified in the devices available to prevent the bumping and scratching of boats when docking. The Firestone Tire & Rubber Company, Akron, some time ago introduced the "rub-strake" molded from a special rubber compound said to be unaffected by blistering sun or salt brine. Suspended at the front of water craft the rub-strake prevents hull abrasions, loosened planking and strained frames. Intended to replace wood or metal guards, rub-strake consists of live rubber cushions in two styles, viz, half-round sections for pleasure craft and full-round styles for dinghies or tenders.

The Kirlin Company, of Detroit, produce a line of Saf-Air fenders. These are of cylindrical construction and consist of a casing made of heavy duck, well stitched, with an extra sleeve to stand rough wear, and an inner tube, or bladder. When in use the bladder is inflated with air, and is re-inflated whenever necessary. It is equipped with a standard tire valve for convenience and is guaranteed by the company for five years. Saf-Air fenders may also be transformed into life rafts by securing three or four of them together. Individually they may be used as life belts. These bladder fenders are made in a wide range of sizes for all yachts and gasoline docks.

Another use of rubber in the motor boat and cruiser field is found in mattresses and cushions merchandised under the trade name of "Seahair." Made by Armour & Company, Chicago, and exclusively distributed through the marine industry by the E. J. Willis Company, of New York City, Seahair mattresses and cushions are made from hair coated with rubber. They are waterproof, vermin-proof, porous, buoyant and no tufting is required since they do not mat down. Seahair mattresses and cushions may be secured in any shape desired and boast of no indentations in the coverings for water to settle on or in.

Undoubtedly rubber plays still other roles in the marine industry. The applications to which it has already been put have served to make motor boating and cruising more pleasurable to its followers. Future shows and expositions will reveal still additional practical uses, possibly for improved speed, maybe for better cruising, perhaps for greater comfort—but whatever the use it is safe to state that it will be advantageous to the marine industry at large.

Halogenated Rubber Products

By Frederick Marchionna

Author of "Latex & Its Industrial Applications"

WE CONCLUDE herewith the abstracts on halogenated rubber patents compiled by Mr. Marchionna. Because of the interest of rubber technologists in chlorinated rubber in recent years these patent abstracts were brought to your attention. It is planned to incorporate this material, at a later date, in book form to supplement the author's bibliography "Latex and Its Industrial Applications." The 53 preceding abstracts will be found in the November, December, 1934, and January, February, 1935 issues of THE RUBBER AGE.—EDITOR.

54.—Rice; U. S. Pat. 1,817,323; August 4, 1931; *Leather Substitute.*

A leather substitute is made by impregnating a loose, thick fibrous bat with a latex mixture; coating one or both surfaces with a rubber composition; superficially treating the coating with a halogenating material, embossing, curing and giving to it a finishing treatment with sulfur chloride or bromine or a mixture of the two. The bat is formed by mixing the following fibres: rayon (50), wool (10), cotton (20), hemp (10). The blended fibres are made into a bat on a cross carding machine, superposing on the first layer others with the fibres of one layer at right angles to those of adjoining layers, until the required thickness is obtained. The web is subjected to water and hammering to compact it slightly, and is then impregnated with a mixture comprising rubber (100) as latex, sulfur (3), heptaldehyde-aniline condensation product (1.5) cocoanut oil soap (1), glue (1), Nekal (3), casein (5), whiting (30), zinc oxide (2), pigment (3). The impregnated material is coagulated by spraying a coagulant on it or by dipping in a coagulating bath, and is dried, after which a coating is applied on one or both surfaces. The coating material comprises crepe rubber or rubber latex (26), pine tar (4), ground chrome leather (15), formaldehyde-ethylamine condensation product (0.75), zinc oxide (5), pigment (14), anti-oxidant (1), sulfur (0.38). The coating is superficially halogenated with sulfur chloride in carbon tetrachloride, and is embossed, after which it is vulcanized and given a finishing treatment with sulfur chloride followed by treatment with a 3% bromine solution. The finish treatment can be combined by using a solution mixture of sulfur chloride and bromine. The material is good for making luggage, etc.

55.—Dyche-Teague; U. S. Pat. 1,819,136; August 18, 1931; *Chloro Rubber Varnishes.*

Chlorinated rubber solutions of low viscosity and high concentrations are prepared as follows: The rubber is first disaggregated by milling, and then chlorinated. Disaggregation is best effected by working the crude rubber thoroughly between coacting rolls running at differential speeds for about 15 minutes until the rubber changes from a viscous solid to a semi-liquid mass. This disaggregated rubber is easily dissolved in benzene, tri-chlorethylene, etc. The resulting solution is further disaggregated by exposure to sunlight or ultra-violet rays. Usually a 11% solution of disaggregated rubber will give satisfactory products. The solution is then chlorinated in any convenient manner until it changes from a dark to a pale yellow color. The solvent, and any hydrogen chloride formed, is distilled off, preferably in *vacuo*, to obtain either highly concentrated solutions or dry chlorinated rubber products.

56.—Deseniss; U. S. Pat. 1,823,260; Sept. 15, 1931; *Stencil Sheet.*

Durable stencils for copying purposes are obtained by coating a paper base with chlorinated rubber, and the paper can be coated on one or both faces. A good coating composition comprises chlorinated rubber (10), benzene (120), a softener such as castor oil or phthalic acid ester (25), and a filler such as talcum or zinc white (70). The stencil so obtained has a high strength against creasing.

57.—Dyche-Teague; U. S. Pat. 1,826,275; October 6, 1931; *Chlorinated Rubber Varnish.*

A varnish of low viscosity and high concentration is made by first subjecting rubber to oxidation and then chlorinating it while in solution. The rubber is oxidized by means of oxygen, air, ozone, or benzoyl peroxide, either in the crude solid form or while in solution. In the example given a thin sheet of crepe rubber is exposed to air or oxygen at 60° C. or exposed to the action of ozone at room temperature. The treated rubber is then milled and dissolved in benzene to obtain a solution of 11% concentration. The solution is then chlorinated with chlorine or hydrogen chloride until the proper degree of chlorination is obtained, after which the solvent is partially or completely distilled off in *vacuo* to obtain a highy concentrated solution or a solid product containing 50 to 60% chlorine.

58.—Oenslager; U. S. Pat. 1,841,295; Jan. 12, 1932; *Rubber Hydrohalide Products.*

Rubber is converted into its hydrohalide by immersing the rubber, in the form of a sheet or a shaped article, in a solution of a hydrogen halide in a solvent which is capable of dissolving a substantial proportion of the halide acid, and of being readily absorbed by the rubber, but is incapable of dissolving the rubber. Most of the esters, or salts of organic hydroxides with organic or inorganic acids have proved capable to dissolve the halide acids, and although they are absorbed in the rubber they do not dissolve it. These include water, ethanol, butanol, ethyl formate or acetate, amyl acetate, diethyl carbonate, ethyl nitrate, etc. In one specific example the hydrogen halide solution is made by bubbling hydrogen chloride gas through ethyl acetate until a 10 to 20% solution is obtained. A thin, unvulcanized rubber sheet is immersed and kept in the treating solution for 36 to 48 hours when it is found that the hydrogen chloride has been carried into the rubber by the ethyl acetate to convert the rubber into rubber hydrochloride. On removing the sheet from the solution it is exposed to a current of warm air to evaporate the ethyl acetate, leaving a sheet having a hard, tough and horny consistency, and an amber translucency. Other hydrogen halides can be used in the process.

59.—Deseniss & Nielsen; U. S. Pat. 1,852,043; April 5, 1932; *Chlorinated Rubber.*

Stable chlorinated rubber products are obtained by dissolving rubber in a solvent unaffected by chlorine, heating the solution above 80° C., and passing chlorine through the heated solution whereby any HCl formed is quickly evaporated, thus obtaining a stable chlorinated product. Thus, crude or vulcanized rubber is dissolved in carbon tetrachloride, heated between 80° to 110° C. and hydrogen chloride passed through until no more HCl evolves from the heated solution. The solvent may be distilled off if desired or used for manufacturing films suitable for wrapping

or photographic purposes; or it may be extruded into coagulating liquids, such as alcohol, benzene, etc., to obtain threads having silk-like lustre. Softeners, dyes, etc., may be incorporated in the chlorinated rubber.

60.—Ellis; U. S. Pat. 1,852,998; April 5, 1932; *Fire Resistant Products.*

Chlorinated rubber, containing 67% chlorine or more, when used for impregnating paper, fabric, etc., renders the same waterproof as well as non-inflammable. The chloro-rubber may contain softeners, anti-acid substances, etc. When it is desired to prevent penetration of the chloro-rubber into the fibres, the latter are first sized with glue, starch, or chlorinated rubber. For glazing a chintz fabric, the cloth is first sized with any desirable sizing materials and then coated with a material comprising chlorinated rubber (7.5), benzol (22.5), toluol (5), alcohol (2), triphenyl phosphate (2) diethyl phthalate (1), and the coated sheet calendered to produce a smooth and glossy surface finish. A piece of white muslin is first sized and then coated with a varnish comprising chlorinated rubber (6.7), naphtha (13.3), corn oil (3), alcohol (2), china clay or other filler (20). This prepared cloth is particularly suitable for window shades. Where the chlorinated rubber has a low chlorine content, the fibres to be coated may be first impregnated with a phosphate, or tungstate, or similar fire-proof salts, to render the fibre more fire-resistant, and then coated with the chlorinated rubber. The coated products may be employed for manufacturing upholstery, hangings, etc.

61.—Warner; U. S. Pat. 1,869,636; August 2, 1932; *Bonding Surfaces.*

Rubber is bonded to metal surfaces, such as iron tanks, drums, etc., by the use of adhesive cement consisting of halogenated rubber as prepared in U. S. Patent 1,869,638. In the lining of the metal receptacle the metal is first cleaned by sand blasting; it is then coated with a brominated rubber cement, and a vulcanizable rubber sheet applied over the cement, and the whole vulcanized. As the brominated rubber is not affected by the curing temperature, and rather tends to retard vulcanization, it is desirable to use two plies of vulcanizable rubber sheets, one containing sulfur, the other the accelerator, placing the sulfur-containing sheet in contact with the brominated rubber cement.

62.—Warner; U. S. Pat. 1,869,638; August 2, 1932; *Halogenated Rubber Cements.*

If rubber is not halogenated to saturation there will be obtained valuable products which are particularly adapted as cements for bonding rubber to metal. Thus, if for each $C_{10}H_{16}$ of the rubber unit molecule weighing 132 grs. there are reacted 40 to 80 grs. of bromine, the resulting brominated rubber has strong bonding power for joining rubber to metal. The halogenation process can be carried in any known manner with crude rubber or rubber in solution. Instead of bromine there may be used chlorine or iodine as the halogenating agent.

63.—Deseniss & Nielsen; U. S. Pat. 1,890,723; December 13, 1932; *Chlorinated Rubber.*

A material which is resistant to the action of chemicals, has good electrical insulating properties, and which is suitable for coating metal pipes or other metal surfaces, cement and concrete surfaces, etc., is obtained by combining a bitumen, such as tar, tar pitches, asphalt, etc., with chlorinated rubber, with or without inert fillers, such as kieselguhr, asbestos, etc. Several formulas are given. In one formula there are used: chlorinated rubber (100), distilled tar (100), benzene (200). In another formula the ingredients comprise chlorinated rubber (100), bitumen (50), benzene (200). Another compounding mixture may comprise chlorinated rubber (100), tar pitch (100), powdered asbestos (150), benezene (200). Any of the compositions, applied to gas and water pipes laid underground, will protect the metal from rusting.

64.—Shew; U. S. Pat. 1,893,966; January 10, 1933; *White Rubber Products.*

A pure white rubber product is obtained by mixing a mixture of white pigments with rubber, sheeting or extruding the mixture, curing and treating the cured product with chlorine water, hypochlorous acid, Na- or K-hypochlorite, etc. A rubber stock may comprise crepe rubber (20 to 36), a titanium-calcium pigment mixture consisting of 30% TiO_2 + 70% $CaSO_4$, zinc oxide (3), magnesium oxide (3), magnesium carbonate (5 to 10), stearic acid (5 to 10), ultramarine blue (0.25), sulfur (8.13), lime (6), acc. (0.5). This stock is sheeted and vulcanized, polished and immersed in a solution of hypochlorous acid until the light yellow or cream color is changed into a pure white.

55.—Beckmann, Nielsen & Deseniss; U. S. Pat. 1,918,370; July 18, 1933; *Chlorinating Rubber Plant.*

A plant for chlorinating rubber for a large commercial production. The plant comprises a rubber solvent supply container; a rubber solution container which is provided with an agitator to effect easy solution of the rubber; a chlorinating vessel supplied with an agitator, heating means, and with a perforated circumferential bottom through which chlorine gas is injected; a receiving container in which the chlorinated rubber is discharged, which is connected to a drier; a solvent recovery system connected with the drier and consisting of a cooler and a drier; a chlorine supply container connected successively with a vaporizer, a liquid separator, and the chlorination vessel; a recovery system for the chlorine and hydrogen chloride escaping from the chlorination vessel, this recovery system including a cooling column adapted to cool the gases to about 20° C., whereby most of the carbon tetrachloride used as a solvent is condensed and recovered as a liquid; and a hydrogen chloride recovery system in which the last traces of carbon tetrachloride are removed. In the operation of the plant, rubber is introduced in the solution vessel and dissolved by the introduction of carbon tetrachloride and by agitation so as to obtain a 5% solution. This solution is allowed to pass into the chlorinator, and heated to boiling. While at this temperature chlorine gas is allowed to pass from the perforated bottom of the chlorinator into and through the solution thereby effecting chlorination of the rubber to the desired degree. When the chlorination is completed the solution containing the chlorinated rubber is discharged into the receiving vessel and then into the drier where the product is dried. The solvent evaporating in the drier passes into the recovery system to condense the solvent and return it to the solvent supply container. The mixture of carbon tetrachloride and hydrogen chloride escaping from the top of the chlorinator is cooled to 20° C., the liquid carbon tetrachloride separated and returned to the reaction vessel, while the hydrogen chloride containing traces of carbon tetrachloride is further processed to remove the last traces of the solvent. The plant can work continuously without interruption.

66.—Schmidt & Deseniss; U. S. Pat. 1,950,820; March 13, 1934; *Chlorinated Rubber Varnish.*

A coating material resistant to shocks and blows consists of a chlorinated rubber product dissolved in a suitable solvent and a hard filler, such as carborundum, quartz meal, etc. These hard fillers should have a grain size of 40 to 100 μ, and should be incorporated in the varnish in suitable proportions in order to give transparent coatings which are beautiful, but do not flake off.

67.—Koch; U. S. Pat. 1,950,894; March 13, 1934; *Chlorinated Rubber Varnish.*

A rubber varnish particularly adapted for corrosion and abrasion coatings is made from chlorinated rubber and chlorinated diphenyl as plasticizer. A chlorinated rubber of 50 to 67% chlorine content is dissolved in carbon tetrachloride or other solvents and the solution combined with other ingredients to make a varnish containing chlorinated rubber (10), chlorinated diphenyl of 58 to 68% chlorine content (2 to 5), cumarone resin (3), xylol (28), toluol (57). The chlorinated diphenyl may be a mixture of 2 parts "Aroclor 1254" (54% Cl) and 3 parts of "Aroclor 1268" (68% Cl). When other ingredients, such as ether gums, drying oils, dibutyl phthalate, pigments, fillers, etc., are incorporated in the varnishes, the coating material may be applied for protecting metal surfaces, underground pipes, etc.

68.—Koch; U. S. Pat. 1,957,786; May 8, 1934; *Chlorinated Rubber Varnish.*

A chlorinated rubber coating material suitable for abrasion and corrosion coatings on metal surfaces, underground pipes, etc., comprises a chlorinated rubber of 50 to 67% chlorine content, an ester of rosin or abietic acid, and oils, gums, etc., if desired, with the necessary solvents. The ester of abietic acid may be hydrogenated. As gums there may be used ester gums, cumarone resin,

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Engineering Uses of Rubber

(Continued from page 288)

1 that a tension curve and a compression curve using rubber and steel adhesion are very closely related.. We have not tried in any way to develop these two curves to this similarity, it just happened that in going over certain deflection charts we found these two closely related and I am sure that if we would further try to make these curves absolutely uniform, we could do so. By varying the cross section and hardness, deflection curves can be duplicated if we use rubber in shear, tension or compression. Variations in the curves can be produced by different cross sectional designs. For instance the hourglass shape deflection curve shown in Chart No. 1.

By using different hardness or size of rubber blocks we have been able to redesign rubber products that were used in shear or tension, put them into compression, and obtain a stress strain curve that was so closely related to the shear device that the maximum deviation was only 2%. The other important factor was that we only used seven square inches in compression, whereas, 16 square inches were used in shear. In testing the devices for vibration they both acted alike. By going further in the investigation in the similarity of curves obtainable in shear and compression, and using different compounds, we are able to do the same work in compression with one cubic inch of rubber, as we previously have done with ten cubic inches in shear. At the same time we increase the life and safety of such a device. This is probably one reason why, from a cost standpoint, we have turned away from shear-type motor supports to compression-type supports.

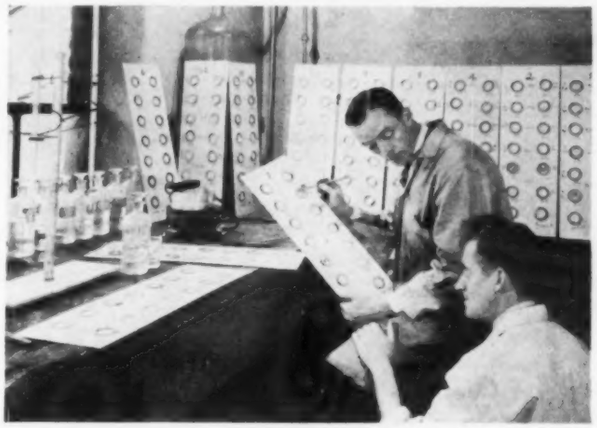
Some interesting curves which we have developed experimentally for rubber springs on automobiles are shown in Chart No. 2. By making use of combinations of compression, shear and tension in the same piece of rubber we were able to vary the design to get almost any deflection curve desired. You will note that we were able to practically reverse the stress strain diagram of most rubber compounds and that at will we can develop a curve convex to the stress axis or even go further. We have been able to have the first part of the curve convex, the center part parallel or lower, and the last part concave to the general stress axis. In other words, we have been able to build up a lot of resistance at the beginning of compression, gradually decrease it, and increase it again at will. We even have been able to obtain at a particular point of the curve a negative load-carrying capacity and then increase the load again at a normal or increased rate.

We developed and tried out these curves on an experimental car, which was made up purely for the purpose of testing a ride of an automobile with a rubber spring. We were perfectly aware of the fact that our design of suspension of the automobile would be impractical for general use and that the geometry of the whole design would not lend itself to a general adaptation. However, we were able to drive this car at eighty-six miles per hour. While the two curves shown in Chart No. 2 were not satisfactory from a ride stand-point we have been able to produce a highly satisfactory ride from a deflection curve with a reduced compression ratio in the center part of the curve. It was, however, not as pronounced a reduction as shown in the curves on the chart. We naturally used this soft part of the curve as the normal riding position of the spring and further developments lead us to believe that in a short time we will have some concrete facts showing performance better than any steel spring suspension.

The possibilities of working out other devices from these experiments are naturally very promising and we hope that automobile engineers will avail themselves of the rubber engineer's services.

Use Rubber in Testing Paint Coatings

IN testing paint coatings to determine their chemical resistance the common practice of immersing a panel in a reagent has the disadvantage of requiring an individual panel for every test made, proving both cumbersome and expensive. Thinly coated panel corners also break down, according to the Sherwin-Williams Company, Cleveland, Ohio, making accurate recordings difficult. Another method, that of putting several drops of a reagent on a panel and covering with a watch glass, is also said to be unsatisfactory for several reasons including the fact that the reagent has a tendency to collect on the inner edge of the glass when the panel is tilted. For these reasons the Sherwin-Williams laboratory has developed the "spot" method which permits the spraying of a uniform coat on a panel.



The "spot" method of testing paints

An airtight seal is made as follows: Rubber rings are cut from 1/16 inch inner tube stock. The inside diameter of the rings is 1⅛ inches and the outside diameter 1¾ inches. After cutting, the rings are immersed in a melted mixture consisting of 50 parts paraffine, 20 parts carnauba wax and 30 parts Halowax 1013. While the melting point of the mixture is about 200° F, it is advisable to hold the temperature of the melt between 250° and 300° F to prevent solidification of the wax when rings are immersed.

Centers for the rings are marked off on the panel to be tested. The panel is then placed under a hot water tap reverse side up. This pre-warming prevents chilling of the wax when the dipped rings are placed on the panel. Excess wax should always be drained off the rings before placing them on the panel, after which they should be pressed at several points to insure complete contact. As soon as the wax has cooled to the point where the surface gloss is lost, a 2,000 gm. brass weight is applied to mold the top of the wax to a smooth, level surface.

One c.c. of reagent may be poured into each ring by means of a pippette. Three inch by two inch microscopic slides are generally satisfactory for covers. Since they are made of colorless glass, many observations may be made without removing them. When inspection of a particular spot is to be made, it is a simple matter to absorb the reagent into a swab of clean cotton to examine the paint surface.

This technique for making chemical resistance tests of a paint film is quick, easy, and accurate. The wax mixture indicated is not affected by any water soluble common acids or alkalis. Concentrations can be controlled by means of the seal, and all notations on reagent, film, time and results can be recorded right beside the ring on the panel. The panels may easily be kept for reference or observation at any time.

Rubber Industry of Czechoslovakia

ACCORDING to statistics revealed by the Bureau of Statistics of Czechoslovakia, that country now has eight rubber manufacturers employing approximately 10,000 workers, with the combined output adequate to meet the requirements of the home market. In 1933 the country imported rubber and rubber goods valued at 74 million crowns, exporting goods valued at 65 million crowns. In the first six months of 1934 its imports were valued at 115 million crowns with export values placed at 94 millions. The great bulk of imports consists of raw rubber and pneumatic tires, the value of the former in 1933 being set at 33 million crowns. Among rubber goods exported by Czechoslovakia are rubber thread, boots and shoes, soft rubber sundries, elastic tissues and clothing with rubber parts. From a monetary standpoint rubber thread is the country's best export.

Airless Auto Tire

DESIGNED with the express purpose of rendering tires puncture-proof, a new type of airless tire has been patented by George C. Craig, of Bloomington, Illinois. (U. S. Patent 1,959,571.) The invention relates to improvements in cushion tires for vehicle wheels, its primary object being to provide a tire composed of an outer casing and a cushion insert which will impart to the tire the necessary resilience without the use of air. The cushion insert consists of inner and outer rubber rings concentrically disposed in space relation and of arc-shape in cross section, with their flat sides disposed in confronting relation. The cushions are placed at uniformly spaced intervals with opposed recesses to receive the solid rubber partitions. According to the inventor these airless tires may be manufactured economically since they can be molded as one piece and require no inner tubes or valves.

Advantages of Better Lighting

(Continued from page 290)

based on the amount of the payroll, and the rate is determined by the accident experience of a given industry, modified by the experience of a particular plant under consideration. With a rate of 1½ per cent the annual premium in the case of 1,000 employees at an average wage of $40.00 per week would be $31,200.

"An insurance carrier might at an average pay the claims resulting from four accidents per month in this plant, and meet its own overhead cost, and still have slight margin of profit. An experience of five accidents per month, one-fifth of them due to improper lighting (a not unlikely event) would probably leave the insurance carrier no option but to increase the rate by 25 per cent. This premium could then be $39,000, an increase of $7,800. If poor lighting costs only $3.00 per employe or $3,000 per year total, the owner's annual expense for poor illumination actually amounts to $10,800—of which $7,800 is required by the insurance company to meet additional accident claims. An expenditure of $6.00 to $8.00 per year per employe for more adequate illumination might save a large portion, if not all, of the latter amount. The important point here is the fact that the cost of accidents, due to poor illumination, greatly exceeds the cost of providing adequate illumination."

From the foregoing facts it is readily evident why industry is taking a definite step toward revolutionizing industrial lighting standards.

The lighting industry for years has had the equipment to make possible illumination as now recommended. But it has only been recently that any one has fully appreciated the intimate relationship between light and sight and human efficiency. Now that the facts are known, and that electrical manufacturers are taking steps towards disseminating this knowledge, it will be interesting to observe how quick industry will be in establishing the new standards as recommended.

Halogenated Rubber Products

(Continued from page 294)

phenol-aldehyde resins, etc. As solvents there may be used xylol, toluol, ethylene dichloride, mono alkilated ether of ethylene glycol, ethyl acetate, etc. Seven formulas are given. In one formula the varnish comprises chlorinated rubber (20), hydrogenated methyl abietate (2 to 6), xylol (53.4), toluol (26.6). To this composition there may be added ester gum (6), or a phenol aldehyde resin, such as "Amberol H-9" (6), or boiled linseed or china wood oil (3.33).

69.—Leatherman; U. S. Pat. 1,961,108; May 29, 1934; *Fire-proofing Fibrous Products.*

Cellulose fibrous sheets are rendered fireproof by first impregnating the fibre with stannic oxide substantially free from alkalies, and then coating with chlorinated rubber. Thus, the fibres are impregnated with sodium stannate, dried and immersed in a 7 to 10% aqueous solution of thorium and cerium nitrate giving a ratio of 99 parts of thorium oxide and 1 part of cerium oxide; or the fibres can be immersed in a 20% solution of ferric sulfate, or in a 5 to 10% aqueous solution of a vanadyl acid salt. With any of these solutions there is obtained the precipitation of stannic oxide or hydroxide *in situ* which is substantially free from alkalies. In order to increase the fire-proofing qualities of the fibres the treated sheet is coated with chlorinated rubber which has the effect of preventing a vigorous, flameless combustion. When the fibres to be treated are unbleached cotton fibres then it is advisable to wet the fibres with a 1% solution of a naphthalene sulfonate salt, after which the impregnation with the stannic oxide, as described above, is made easier.

70.—Arnold; U. S. Pat. 1,971,439; August 28, 1934; *Printer Blanket.*

A flexible and resilient printer blanket having a smooth surface which is resistant to oils and repellent to inks is made by applying a chlorinated rubber coating over the ordinary printer blanket. Three examples are given. In one example the coating varnish comprises chlorinated rubber (20 to 40), benzene (10 to 75), a plasticizer (3 to 10). Another varnish may contain chlorinated rubber (30), xylene (25), tricresyl phosphate (5); while in the other example there are combined chlorinated rubber (30), benzene (30), dibutyl phthalate (6). When it is desired to use pigments or dyes in the varnish it is preferred that the pigment, such as carbon black, is first mixed with the plasticizer and then incorporated in the chlorinated rubber solution.

71.—Gebauer-Fulnegg & Moffett; U. S. Pat. 1,980,396; November 13, 1934; *Rubber Hydrohalide.*

A rubber hydrohalide is prepared by treating a dialefine polymer, including natural and synthetic rubber with dry hydrogen halide, which may be in the form of a gas or anhydrous liquid. Crude rubber is milled and worked into thin sheets and these sheets are introduced in an autoclave. Dry hydrogen chloride gas or liquid hydrogen chloride is then passed into the autoclave and contacted with the thin rubber sheets. Under the action of the acid the rubber is changed into a rubber hydrochloride. The temperature in the autoclave is kept low, and the exposure of the rubber to the hydrogen chloride is maintained long enough to obtain a product which will contain 28% or more of chlorine. With a crepe rubber sheet 0.02" thick, and hydrogen chloride under ordinary atmospheric pressure, the reaction will be completed in 36 hours; if the gas pressure is increased to 10 atmospheres, the reaction takes 8 hours. The hydrohalide produced yields thin, transparent films which are particularly suitable for wrapping packages.

New Equipment

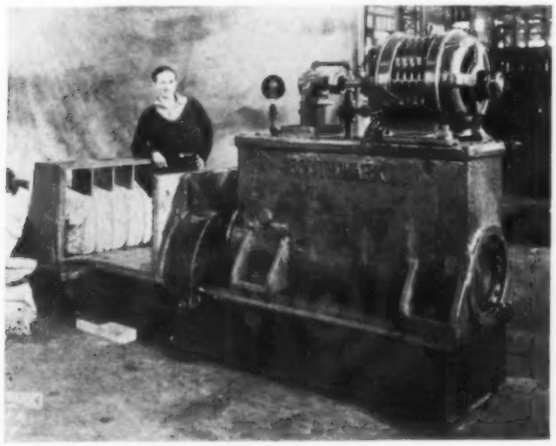
Ames 2″ Throat Pocket Gauge

A DEEP throat gauge that measures thicknesses of sheets 2 inches in from the edge has been introduced by the B. C. Ames Company, Waltham, Massachusetts. Conveniently carried, it is accurate and quick to operate

since the anvils are opened by pressing down the lever at the top of the gauge and closed with a uniform spring tension by simply releasing the lever. The 2-inch dial is graduated to indicate thousandths of the inch yet wide apart so that finer measurements are easily estimated. A chart attached to the back of the gauge gives fractions and decimal equivalents. It has a capacity for materials up to 5/16″ in thickness.

Southwark Hydraulic Rubber Shear

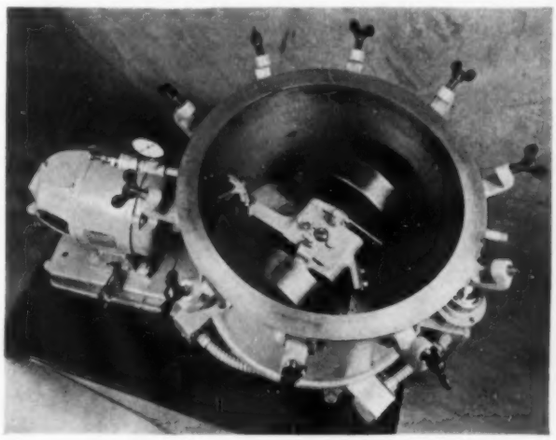
DESIGNED with the purpose of overcoming mechanical and service objections of other types, and said to have a sufficiently low man-hour-per-bale rate to overcome economic objections, the Baldwin Southwark Cor-



poration, Philadelphia, Pennsylvania, has introduced a new hydraulic rubber shear for cutting rubber bales of all sizes and kinds. The machine consists essentially of a horizontal table having at one end a rectangular box containing four crossed knives. At the other end of the table is a horizontal ram and cylinder, a liquid supply tank and a motor-driven pump for fluid pressure development. There are no rods, bolts or other impediments to retard the operation of placing a bale ready for cutting. Bales may be handled from above or from either side of the machine with equal facility. Features of the Southwark Hydraulic Rubber Shear include: it cuts any kind of rubber; handles any size of bale; easy to load; self-contained; one stroke completely cuts one bale; automatic cycle; and is of high-speed operation.

Simpson Intensive Mixer

WIDELY used for many different types of dry, semi-plastic, plastic and pasty mixing operations, the National Engineering Company, Chicago, has recently introduced a new laboratory size Simpson Intensive Mixer. The machine consists of a circular stationary pan in which is mounted a combination of plows and mullers which have a revolving action, the plows turning the material over and lining it up under the mullers which impart an intensive mulling, rubbing, kneading or smearing action. This motion results in a rapid, thorough and uniform mixing and blending of materials, and thorough impregnation of the solids or fibrous materials with any liquids in the mix. After preparation the materials are automatically discharged by the action of the plows through a door in the



bottom of the pan, complete discharge generally requiring less than one minute. Simpson Intensive Mixers are available in several sizes and production units may be equipped with steam or water jackets for temperature control. At present some of these machines are being used on a packing made up of asbestos fibre, rubber latex and graphite. Other applications are also found in the rubber industry.

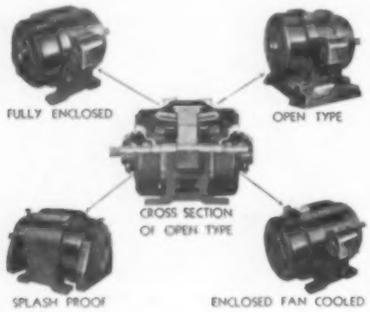
American Temperature Controller

SIMPLE in design and precise in operation, the American Precision Temperature Controller has recently been introduced by the American Schaeffer & Budenberg Division of the Consolidated Ashcroft Hancock Company, Bridgeport, Conn. The use of this controller in process work is said to assure fuel economy, production uniformity, labor savings and reduction of spoilage. The heart of this instrument is in the bellows which is seamless two-ply metal made by a special process from a seamless tube. This construction, according to the company, assures maximum flexibility and enduring strength. Extra long adjusting springs are used to insure good sensitivity and a

long range of adjustment. The valves are suitable for all pressures up to 250 pounds per square inch. American Precision Temperature Controllers come in two sizes, one being ⅜" to 1½", the other 2" to 4".

Harnischfeger Convertible Motors

A NEW line of convertible squirrel cage and slip ring induction motors has been announced by the Harnischfeger Corporation, Milwaukee, Wisconsin. They include all standard frequencies for service ranging from 110 to 220 volts. The outstanding feature of these new



P&H motors is their convertibility from open type to fan cooled, splash proof or totally enclosed construction. This is accomplished through the design of the frame, end heads and bearings to permit interchangeability in the four above mentioned types of single or multi-speed squirrel cage and slip ring motors. Among other features is the mounting of the stator laminations which are stacked between heavy steel end rings and the entire assembly then welded to the frame. This construction provides rigidity and makes it impossible for the stator core to shake loose. The rotor windings are assembled from round or rectangular hard drawn copper bars which are placed in the rotor slots without insulation or slot wedges. The ends of the bars are brazed to the end rings by an electric arc torch.

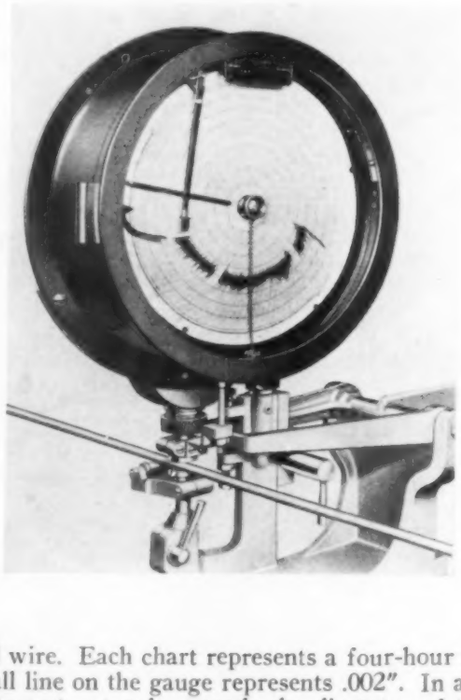
Walser Automatic Timing Devices

TWO recent timer developments have been announced by the Walser Automatic Timer Company, New York City. One of these is the Series No. 75 described as a

new type of automatic timer which provides higher switch capacity with greater compactness, flexibility and efficiency, together with more simplified operation than heretofore available. The second development is known as the "Adjustable Stop Post," a device with which timers may be equipped to allow the convenience of rapid resettings of the indicator at the same time intervals anywhere on the dial scale. This development is available in stock model timer No. 8033 (30 minute dial) only. The "Adjustable Stop Post," as its name implies, is a moveable arm which may be fixed at any time graduation on the dial, until it is moved to another time interval or out of the way for variable time operations. When set for repeat intervals, it allows timer operations to be repeated without pausing for exact adjustment of the dial pointer. Appliances and equipment operations, laboratory and testing machinery, and manufacturing processes requiring set interval timing, find this device most efficient in fulfilling their peculiar automatic timing requirements.

Wire Measuring Recording Gauge

FEDERAL Products Corporation, 1144 Eddy Street, Providence, Rhode Island, is offering a supplementary recording gauge, made by the Foxboro Company, for use in connection with Federal continuous wire measuring instruments. The new gauge, readily attached to the Federal model, keeps an exact record of each run of rubber



insulated wire. Each chart represents a four-hour run and each small line on the gauge represents .002". In addition, this implement not only records the diameter of the wire but also shows the number of breaks and the time consumed to repair them.

G-E Air Circuit Breakers

A NEW TYPE of trip-free air circuit breaker, under the designation of Type AL-2, has been introduced by the General Electric Company, Schenectady. It was designed for buildings, industrials and power stations. It is said to provide exceptional safety with high interrupting ratings, low maintenance, long operating life due to solid-contact construction, faster operating time and reliable operation. The new air circuit breaker has a positive locking latch and trip mechanism. Accessories consist of a shunt trip, a self-resetting undervoltage device, auxiliary switches and a contact pressure indicator.

REVIEW SHELF

• Monthly Review of New Books, Pamphlets, Company Catalogs, Service Bulletins, House Organs, etc., Pertinent to the Industry

1934 A.S.T.M. Proceedings. Published by the American Society for Testing Materials, 260 S. Broad Street, Philadelphia, Penna. Two Sections. Volume 34. $5.50 each (heavy paper binding).

Composed of two sections these books treat with the proceedings of the 37th Annual Meeting of the A.S.T.M. held during the week of June 25-29, 1934, at Atlantic City, N. J. Part I contains committee reports, new and revised tentative standards and tentative revisions of standards. Part II is devoted to the technical papers presented at the meeting. The annual reports of 44 standing committees, including Committee D-11 on Rubber Products, are reproduced. In addition to all of the formal papers presented at the 1934 meeting Part II includes the extensive oral and written discussion which followed the presentation of technical papers. Of particular interest to the rubber industry are three articles, i. e. The Testing of Raw Materials for Rubber Compounds, by B. S. Taylor; The Testing of Rubber and Rubber-Like Materials for Oil Resistance, by O. M. Hayden; Materials for Use in Structural Engineering Models, with Special Reference to Rubber Compounds, by A. V. Karpov.

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Jungle. By Ferreira De Castro. Translated from the Portuguese by Charles Duff. Published by the Viking Press, 18 East 48th Street, New York City. 340 pp. $2.50.

Based on years spent in Brazil, several of which were spent as a rubber-tapper, the author, in the form of a novel, tells the story of a young man, a university student, exiled from Europe because of political affiliations, who is thrust suddenly into the unfamiliar and, according to the story, almost hopeless life of a tapper. The book paints a vivid picture of the trials and tribulations of rubber-tappers in the depths of the Brazilian jungle, up the winding Amazon River, including the terror and fear of fever and savages. The lives of these residents are swayed solely by the current price of rubber. Cut off from civilization proper these tappers, at the mercy of the manager or owner who rules with a strong hand, lose all sense of propriety and morale. The book is replete with mention of the various processes in gathering crude rubber in the Amazon regions. It is recommended to those in the rubber industry who are interested in the story behind the scenes in the gathering of crude rubber and the lives of the men who make possible this industry in the jungles of Brazil.

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The Chemical Formulary. Volume 2. Edited by H. Bennett. Published by the D. Van Nostrand Company, New York City. 510 pp. $6.00.

The volume preceding this latest addition to the "chemical formulary" contained thousands of formulas covering preparations used in daily life. Volume 2 presents several thousand additional formulas, selected by 109 chemical experts, covering further preparations, including those for transparent silk, rubber cements, moisture-proofing processes, polishes, inks, etc. Selected for the easiest, simplest and surest methods, the formulas in both volumes are intended for use by individuals who lack specific chemical knowledge and those who wish a miniature encyclopedia close at hand.

•

Handbook of Industrial Fabrics. By George B. Haven. Published by the Wellington Sears Company, 65 Worth Street, New York City. 538 pp. $2.00. (A complimentary copy will be sent free to any American industrial organization which uses industrial fabrics upon request from one of its executives who writes on business stationery and who indicates his position).

This handbook is written to be of service to engineers and office staffs, as well as buying and selling organizations in order to clarify and extend the general stock of knowledge regarding the physical properties of fabric, according to its introduction. This "service" it accomplishes in its many chapters devoted to complete descriptions of various fabrics, together with tables, charts and graphs depicting the properties of each. It is recommended to every executive whose products deal with fabrics.

•

Seven Years With Gastex. Issued by the General Atlas Carbon Company, 60 Wall Street, New York City. 28 pp.

Written for the chemists and technologists of the rubber industry this booklet summarizes some of the many uses of Gastex Carbon Black in pleasing, attractive style. It is the story of Gastex since its introduction seven years ago, stressing its advantages and properties. Copies are available for all interested parties, which means all manufacturers using carbon blacks.

Goodrich Engineering Data of Industrial Rubber Goods. Published by the B. F. Goodrich Company, Akron, Ohio.

Containing 21 pages of useful information and describing more than 200 rubber items, this catalog of engineering data is designed to simplify the selection of belting, hose and other mechanical rubber goods for industrial service. A section on transmission belting includes a discussion on the relative merits of rubber and leather, a review of belting requisites and helpful hints on installation. Supplementing the information on conveyor belting, hose, rubber-lining and many other products are glossaries, tables and technical data. Printed attractively in two colors this booklet should be a valuable asset to purchasing agents of industrial concerns.

•

Labor's Opportunity to Promote Recovery. By Allen W. Rucker, in collaboration with N. W. Pickering. Distributed by the Farrel-Birmingham Company, Inc., Ansonia, Conn. 8 pp.

Tenth in a series of booklets discussing moot questions of the current day, the co-authors devote this edition to labor and its part in promoting recovery. They point out that despite higher wage rates and shorter working hours a sharp reduction has been recorded in the annual income per worker employed while there has been a sharp rise in the price of merchandise. They urge modification of wage rates and working hours "sufficient to lower production costs to the level of incomes made," alleging that business volume would speedily increase through such measures.

•

Tornesit. Issued by the Hercules Powder Company, Wilmington, Delaware. 20 pp.

Paints, emulsions, binders, adhesives and plastics can be formulated with Tornesit, a chlorinated rubber base, to contain strong chemical resistance. The chemical and physical properties of this base are outlined in this attractively printed booklet which is profusely illustrated. Details concerning its appearance, odor, inflammability, gravity, stability, moisture content, dilution data and solubility are given. The preparation and application of Tornesit paints, including spraying and brushing methods, are discussed. Suggestions for the use of Tornesit are made. The booklet concludes with a brief history of chlorinated rubber and the chemistry of Tornesit.

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Profit Through Paint. Distributed by the Sherwin-Williams Company, Cleveland, Ohio.

Termed a "Guide to Profit Through Paint" this finely printed booklet, spiral bound, discusses the importance of industrial paint in plant conditioning. It contains short chapters on Light Reflection, Protection, Personnel, Unit Costs, Color, Heat Reflection and Sanitation. A graphic painting maintenance guide is included. A series of "before and after" photographs clearly depict the benefits of industrial paints in factories and warehouses from standpoints of improved lighting, operating efficiency and increased production. Pointers on the purchasing and application of paint are also given.

Editorial Comment

Anent Federal Taxes

ALTHOUGH we have no complaint against the various excise and process taxes enforced by the Federal Government (at least not at this writing) it is interesting to note to what an extent the payment and provision for payment of these taxes held down net profits of rubber manufacturers and suppliers as revealed by financial statements for the fiscal year of 1934.

For instance: the U. S. Rubber Company reports net sales exceeding one hundred million dollars in 1934 out of which more than seven and one-half millions were deducted for the payment of taxes, $5,330,000 being paid on Federal excise and process taxes. The Fisk Rubber Corporation, in its second annual report, shows $420,927 paid for Federal Cotton Process Taxes, $742,163 for Federal Excise Taxes, and $84,615 for Federal Income Taxes. B. F. Goodrich, which also had net sales of more than one hundred million dollars for 1934, reports a provision of almost a half-million for income taxes. Goodyear's 1934 net sales totaled $136,800,764 with provision for taxes amounting to $13,309,505.

As E. D. Levy, president of Fisk Rubber, points out in his financial statement, the various taxes assessed against rubber companies account for approximately 14 cents of every dollar of net sales. In the case of Fisk this amounted to twice the net profit of 7 cents on every dollar of sales.

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What Price Strikes?

THERE is an old adage that states "we grow as long as we're green" but apparently it was omitted from industrial textbooks. The last few years have witnessed a series of recurring strikes, each one worse than the preceding one. In every instance a settlement of some kind was reached, whether the strike lasted a week or a month. The recent Ohio Rubber Company strike is an excellent example. It was one of the most disorderly and violent industrial disputes witnessed in the State of Ohio for a decade. The strike is settled, but broken heads and bones remain, a bitterness prevails that only time can eliminate and the company strained its relations with its customers close to the breaking point because of retarded delivery of needed goods. What price strikes?

Paul W. Litchfield, president of Goodyear, pointed out in a recent radio address that it is the worker's right to strike, but it is also his privilege to work. If we have too many strikes by minorities for purposes of labor organization, as was apparent in the Ohio Rubber fiasco, then it is up to the Government to arm a special board of some kind with sufficient powers to make it possible for the majority to work. That the minority can tie up a factory has been demonstrated too often.

It is granted, as the *Cleveland Press* points out, that compulsory arbitration or adjudication of industrial disputes is abhorrent to both organized labor and individual employers on principle, but nothing will turn public sentiment more quickly in the direction of compulsory adjudication under Government supervision than an epidemic of minority strikes for organization purposes.

The current question when industrial disputes arise seems to be a choice between the picket line and the council room. All too quickly does labor decide on the picket line with the result that the manufacturer threatened organizes a miniature defensive army for his own protection to property and equipment and for his loyal workers. Is it not possible to select the council room first? And with a personage or committee in that council room representing the Government with sufficient power to force a settlement upon both interested parties with recourse to the law for any dissatisfied body?

We may be accused of painting rainbows or having pipe-dreams but when we check up and find that every industrial dispute is eventually settled after negotiations between capital and labor and a third party (with all sides generally claiming victory) then we must again ask—What Price Strikes!

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The Weirton Decision

THE recent decision rendered by Federal Judge John P. Nields, of Wilmington, in the Weirton Steel Company case, is bound to have its reverberations in the rubber industry. The court held that labor relations between the company and its employes did not affect interstate commerce and consequently are beyond the power of the Federal Government to regulate under the now-famous Section 7a of N.R.A. It also held that financial support by the company of the union with which it bargains does not constitute an act of interference, restraint or coercion in the free choice of representatives by employes for collective bargaining. Both of these issues confront the rubber industry.

On April 15 next the Circuit Court of Appeals will hold hearings on the petitions of both Firestone and Goodrich at Cincinnati to determine whether the National Labor Relations Board has the legal right to order elections in their plants, as it did last July, to determine whether employes prefer a company union or an outside union to act as their bargaining agency. Both concerns base their claims on being engaged in intrastate commerce, a claim almost parallel with that of the Weirton Steel Company. Although rubber and steel have little in common it is safe to state the steel decision in this instance will have its effect on April 15 at Cincinnati.

CURRENT • NEWS
of the Rubber Industry

MARCH, 1935

Rubber Labor Unions Preparing Vigorous Drive to Secure Collective Bargaining Agreements

Union Claims Victory in Ohio Rubber Settlement—Washington Labor Board Will Hear Arguments in the Firestone "Blue Eagle" Dispute—Unrest Prevails

RUBBER manufacturers in and around Akron will be faced with the strongest demands yet made by the organized labor unions in the next few weeks since a determined effort to open collective bargaining negotiations with rubber companies is now being prepared by the unions affiliated with the American Federation of Labor. The guiding force in this offensive will be the United Rubberworkers' Council, of which Coleman Claherty is president, which received new votes of support from individual local unions last month. A series of general meetings is being arranged at which will appear nationally prominent leaders in the field of labor including John L. Lewis, president of the United Mine Workers of America, and Francis J. Gorman, who headed the labor element in the recent textile test of strength. Mass meetings will also be held to buoy up present disciples and to attract many new members.

The "spring offensive" is the result of both victory and defeat for the rubber labor unions, plus the determination of American Federation of Labor leaders to fully organize Akron and vicinity before spreading their activities to other rubber centers. The "victory" was the settlement of the Ohio Rubber Company strike, at Willoughby, Ohio, while the "defeat" is recognized in recent decisions by various courts with respect to NRA provisions, notably the Federal Court decision in the Weirton Steel case.

So set is the American Federation of Labor on organizing the rubber workers that it has granted special concessions to the local unions at Goodyear, Goodrich, Firestone, and other factories, permitting the reinstatement of delinquents and the signing of new applicants at a reduced rate. Labor leaders declare that future action will be the result of union plans without recourse to government boards and the courts. This is significant of an early mass strike threat.

Violence Marks Ohio Strike

Although the unions claim a victory in the settlement of the Ohio Rubber Company strike, the settlement was actually in the form of a compromise. On February 19 the strike went into effect because of the failure of extended negotiations, according to the United Rubberworkers' Union which demanded recognition as the bargaining agency, seniority rights, abolition of the company union and abolishment of the check-off system. At the time the strike was called the company employed about 900 men and was working at capacity turning out rubber boards and mats for the Ford Motor Company and General Motors, as well as rubber accessories for Studebaker.

Violence was prevalent throughout the strike which lasted eleven days in all. Pickets and sympathizers clashed continually with guards placed around the plant and with deputy sheriffs. Gas bombs and bricks were thrown almost daily. While there were no fatal casualties many broken bones resulted. Some 600 workers who did not walk out were marooned in the Willoughby plant during the entire extent of the strike. Beds were prepared for them and food brought into the plant by truck. According to Franklin T. Smith, president of Ohio Rubber, the strike did not halt operations within the factory.

Charges and counter charges filled the air. Attorney Joseph B. Shepler, counsel for the rubber union, (who, incidentally, is a brother-in-law to William Green, A. F. of L. president) charged that the strike was brought on because of the "merit clause on seniority," all other differences having been ironed out. The company charged the strikers with constituting a minority of the employed workers.

Shortly after Ralph L. Lind, secretary of the Regional Labor Board, at Cleveland, entered the controversy on February 26, a series of conferences between the principals were arranged the upshot of which was the agreed upon compromise which settled the strike on February 28. Under the terms of the compromise recognition is granted the union to speak for its members only, and not for non-members employed by Ohio Rubber; seniority rights in lay-offs and rehirings were granted the union, but the company retains the right to be the sole judge of efficiency in the matter of seniority rights; the check-off system is eliminated. The "company union" dispute was settled by the company agreeing to grant such an organization no privileges which it did not also extend to the union.

RMA Akron Office

The Rubber Manufacturers Association, which now maintains headquarters at 444 Madison Avenue, in New York City, has opened a branch office in Akron for the purpose of closer cooperation with tire and rubber manufacturers in and around that city. The Akron branch office is located in the United Building and is in charge of A. L. Bowman, who has been associated with RMA activities for many years. It is reported that closer cooperation made possible by the existence of the Akron office will aid in stabilizing tire prices and hold dealers to accepted retail sales level, the aim of the recent conferences among rubber manufacturers.

The battle by the Firestone local of the United Rubberworkers' Union to remove the "blue eagle" from that company on the ground that it had violated Section 7-A of NRA, continued last month. Several hearings were held before the Regional Labor Board at Cleveland, with Mr. Lind presiding. Three specific charges made by the union were dismissed early in February. After hearing final arguments the Regional Board delayed handing down a decision for several days, and finally announced on February 2 that additional arguments will be presented before the National Labor Relations Board on March 11.

Advance Cincinnati Hearings

In the meantime the National Labor Relations Board took a hand in the proceedings before the U. S. Circuit Court of Appeals, at Cincinnati, with respect to the petitions filed by both Firestone and Goodrich for a review of the board's order directing the holding of elections at their respective factories last December. Because of union unrest and a desire to have a definite court ruling the Board succeeded in having the Cincinnati Court advance the hearing on these petitions to April 15. Both rubber companies claim that the National Relations Labor Board lacks the legal authority to order elections.

The Weirton Steel decision by the Federal Court rendered recently will probably have a bearing on the decision of this case. This decision was based on one major point, viz. was the company engaged in interstate or intrastate commerce? The Court decided that the Weirton company is engaged in intrastate commerce and therefore is not obliged to live up to the provisions of Section 7-A of the NRA. Both Firestone and Goodrich based their petitions on the grounds that they were intrastate companies. It has been pointed out that both companies sell finished products to sales companies also located in Akron, thus making a stronger point than in the Weirton instance.

FORMULATING PLANS FOR NEW YORK ACS MEETINGS

Plans are rapidly being completed in connection with the 89th meeting of the American Chemical Society to be held in New York City the week of April 22 to 27. This meeting will probably be the largest ever held by the Society, since the 300th anniversary of the chemical industry is to be celebrated at the same time. The New York Rubber Group is scheduled to act as host to members of the Division of Rubber Chemistry.

Official headquarters for the week will be maintained at the Hotel Pennsylvania. The other three official hotels include the New Yorker, the Governor Clinton and the McAlpin. The Rubber Division will hold its sessions on Monday and Tuesday, April 22 and 23. All sessions will be held at the Hotel New Yorker. The Division will hold a banquet of its own on Monday night, April 22.

Divisional programs of the A.C.S. will be held at the various hotels with the majority of sessions scheduled for the Pennsylvania Hotel. The regular annual banquet will take place on Wednesday night, April 24. Current plans call for the appearance of several nationally prominent individuals on the speakers' rostrum combined with an excellent fare of entertainment. For the further entertainment of visitors to the meetings trips to various points of interest are being arranged. The Rubber Division plans call for visits to the plants of the U. S. Rubber Company and Raybestos-Manhattan, Inc., both at Passaic, N. J., on Tuesday afternoon, April 23.

The secretary of the Division of Rubber Chemistry, A.C.S., is C. W. Christensen, of the Rubber Service Laboratories Company, Second National Bank Building, Akron, Ohio.

Firestone Seeks Fabric Plant

Negotiations have been under way for the last several weeks between Harvey Firestone, Sr., chairman of the board of the Firestone Tire & Rubber Company, Akron, and executives of the Manville-Jenckes Company, Providence, Rhode Island, for the purchase of the Gastonia, North Carolina factory of the latter concern. Although no decision has been reached as yet, engineers and accountants of the Firestone company have been at the North Carolina factory for several weeks making inspections. Mr. Firestone made a personal inspection of the factory on February 25, stopping off on his way to his winter home at Miami Beach. It is understood Firestone wants the Gastonia factory for the manufacture of tire fabric.

Viles Protests Tariff Rates

A. L. Viles, president and general manager of the Rubber Manufacturers Association, New York, protested strongly against unjustifiably high tariff rates, in an appearance before the Senate Agricultural Committee at Washington, D. C., on February 7. He declared that revival of American rubber exports depends largely on the alleviation of such rates and exchange restrictions, in addition to the increase of foreign purchasing power. He also added that in case broad exchange trading agreements are established with foreign countries, American industries should be protected from foreign imports manufactured at low cost.

An Office of Rubber

The new offices of the Rubber Growers' Association, at 19 Fenchurch Street, E. C. 3, London, England, have been furnished with as many rubber accessories as possible. Rubber flooring is used almost exclusively. Where rubber flooring was not utilized the floors are covered with latex-backed carpets. The council table in the conference room has a rubber cover. All of the chairs are upholstered with "Dunlopillo." Arrangements are being made in the entrance hall of the new offices for exhibits intended to demonstrate the newer uses of rubber for the benefit, primarily, of shareholders in rubber companies who will attend meetings of their respective concerns in the council room of the association.

HENDERSON AGREEMENTS HELD BINDING BY COURT

According to an opinion rendered on February 26 by Judge C. H. Huston, of Richland County (Ohio), the Henderson Tire & Rubber Company, Bucyrus, Ohio, is authorized to collect on all contracts of prospective purchasers of the company's stock who agreed to purchase such stock and failed to make payments when due. The decision was rendered in a suit brought by Henderson Tire against one H. J. Himler.

Defense attorneys contended that the paper signed by Mr. Himler was not a binding contract, that it was without consideration, that it was indefinite and uncertain, and that it was not the intention of the parties at the time of signing that the signers were binding themselves to purchase stock in the company.

Judge Huston's opinion held that the signers of the contracts are bound by its terms and conditions when the terms and conditions have been fully complied with, the company maintaining that compliance has been made in all respects. The court also decided that it would not pass upon several other suits pending on the same question on the theory that if the higher courts are called upon to rule in the Himler suit then the final decision would be applicable to the balance of the suits still on the calendar.

NEW YORK RUBBER GROUP PLANS ANNUAL OUTING

The New York Rubber Group has decided to dispense with its regular Spring meeting since it would conflict with the 89th meeting of the American Chemical Society, to be held in New York City the week of April 22 to 27. Instead of the regular meeting members of the group will participate in the sessions scheduled during that week at the Hotel New Yorker of the Division of Rubber Chemistry and will act as hosts to that Division during its two-day meeting. (Details of the A.C.S. meetings will be found elsewhere in this issue).

According to Chairman Bruce Silver, of the New Jersey Zinc Company, the Group will hold another of its popular outings this year probably sometime in early June. A site for the outing has not as yet been decided upon. The regular Fall meeting will be held later in the year sometime in October.

ORDER REORGANIZATION OF KELLY-SPRINGFIELD

The affairs of the Kelly-Springfield Tire Company continued to increase in complications last month. A temporary receivership was dismissed over the New York corporation in January and new officers appointed to continue operations. However, on February 25 two stockholders of the company filed suit in New York of involuntary proceedings for "relief of debtors" seeking to effect a complete reorganization.

On March 2 Federal Judge W. Calvin Chestnut, of Baltimore, Maryland, in which state Kelly-Springfield maintains its factory at Cumberland, valued at approximately $16,000,000, approved a petition brought by the company to reorganize under Section 77b of the Bankruptcy Law and appointed Thomas B. Finan, of Cumberland, and Edmund L. Burke, of New York, as trustees. The company petition for reorganization was filed in the Maryland courts shortly after the one filed in New York by the two stockholders.

Preceding the Maryland petition Federal Judge Murray Hulbert of New York denied a motion by creditors to prohibit the company from moving its address and offices from New York to Cumberland, Maryland. Counsel for Kelly-Springfield explained that directors were considering such a move in the interests of economy only, but had adopted no definite plans. It was agreed that should such a move be decided upon creditors would be notified in sufficient time to further petition the court.

Tire Molds Ruled "Dies"

The Appellate Court in Akron on March 1, upheld a decision previously rendered by Common Pleas Judge L. S. Pardee to the effect that tire molds are "dies" and as such are not subject to tangible taxes as per the claim of the Ohio Tax Commission. The decision was in answer to a suit brought by the B. F. Goodrich Company to prevent the Commission from collecting $35,549 in taxes on equipment valued at $1,114,000. It is reported that the decision in favor of Goodrich will save rubber manufacturers in the State of Ohio approximately $250,000 in taxes.

Cancel Rubber Labor Board

The National Recovery Administration board, at Washington, D. C., issued an order last month, according to the Blue Eagle, house organ of the NRA, canceling Administrative Orders Nos. 156-21 and 174-9, which established a rubber industry labor board. The latter orders were issued on July 10, 1934, and provided for a three-man board to settle labor disputes in the rubber industry by arbitration. Subsequent developments proved that this created board lacked actual authority, which led to its dissolution.

1934 Shipments Set Record

World shipments of crude rubber in 1934 from producing countries exceeded all previous records, according to the Leather-Rubber Division of the Department of Commerce. Total exports of rubber last year amounted to 1,010,000 long tons, compared with the previous high of 846,000 tons set in 1933, an increase of 19%. This record shipment in 1934 is in keeping with the all-time record set for rubber consumption in the same year as previously reported.

NATIONAL MACHINERY CHANGES MANAGEMENT

M. D. Kuhlke is Board Chairman and Also Treasurer Nils Florman Named President, with F. V. Brecka as Secretary—Entire Engineering and Development Staff Stays

Announcement has been recently made of a change in management of the National Rubber Machinery Company, Akron, Ohio, which is expected to put the company on a sounder operating basis and in a better position to serve the domestic and foreign rubber industry with its line of tire and rubber machinery.

M. D. Kuhlke, who has been a member of the directorate since the formation of the company, continues his duties as treasurer and takes on the added duties of chairman of the board. The new president and general manager of the company is Nils Florman, a banker with international connections. The only other new officer is Frank V. Brecka, secretary and assistant treasurer.

In the factory at Akron, John Shaub, who has been with the company for many years and who has assisted in the development of much of the company's line of machinery, remains in charge of the shop. All the other executives in charge of engineering and development have also been retained.

In the East, H. J. Smith remains as Manager in charge of Eastern and Foreign sales. Mr. Smith has been in the rubber industry over 33 years, having been connected with Goodyear for over ten years in the early period of that firm's development. He is not only well known among rubber factories in this country but has also a large acquaintance in foreign countries, having helped in the design and building of rubber factories in Japan, Mexico and other countries.

The National Rubber Machinery Company operates plants in Akron and Columbiana, Ohio and in Clifton, N. J., with manufacturing facilities in Canada and England.

The present company was formed in September, 1928, being an amalgamation of four leading rubber machinery plants: the Akron Rubber Mold Co., the Kuhlke Machine Co., both of Akron; DeMattia Bros., Clifton, N. J., and the Banner Machine Co., of Columbiana, Ohio. The line of National rubber machinery and equipment includes tire and mechanical molds, dies, cores, chucks, individual tire and tube vulcanizers, building drums, tire building machines, laboratory equipment, vacuum expanders, bias cutters, buffers, bead winders, agitators, toggle presses, flap vulcanizers, mill apron mechanisms, splicers, crude rubber cutters and other special equipment, and it is expected to branch out shortly in the general machinery line.

Amend Goodyear Complaint

The Federal Trade Commission issued an amended complaint against the Goodyear Tire & Rubber Company on March 5 in its suit against that company for alleged price discrimination in its contract to supply tires to Sears, Roebuck & Company. The amended complaint was issued to conform with evidence and testimony garnered in the hearings held for the past twelve months or so and declares the alleged price discrimination tends to create a monopoly in the Goodyear company in the sale of rubber tires and inner tubes to wholesale and retail dealers, including those owned or controlled by Goodyear.

NILS FLORMAN

APPROVE CODE STANDARD FOR RUBBER INDUSTRY

The National Recovery Administration, on February 20, approved a code amendment establishing minimum standards of quality for rubberized automobile-top fabrics sold to the jobbing, replacement and accessory trades.

The amendment, which is in accordance with article IV-A, section 7, of the automobile fabrics, proofing, and packing division of the Rubber Manufacturing Code, fixes a quality floor below which manufacturers will not be permitted to go. Material which does not conform to the quality specifications must be marked conspicuously with the word "seconds" at regular intervals on the fabric.

Standard specifications include length, width, and weight requirements for double and single toppings for both open and closed cars and a number of inspection rules setting forth directions for determining permissible color and finish variations, etc.

Manufacturers are required to stamp all products with a characteristic identification stamp as a protection against unjust claim or shortage. Rejections due to visible defects must be made prior to cutting.

New Tire Market

The growing trend toward changing horse drawn vehicles from steel-rimmed wagon wheels to wheels equipped with pneumatic tires has opened up a new tire market. According to *Food Industries* approximately 1,500,000 tires are used annually in the food field. Horse drawn vehicles, of which there are 250,000 still in use, are gradually being equipped with pneumatic tires. These figures apply only to the food field. Evidence is on hand with regard to tire possibilities in other fields. The trend to this newly-created market is pointed out in the current issue of *Witcombings*, attractive house organ of Wishnick-Tumpeer, Inc.

RECENT ACQUISITIONS MADE BY UNITED CARBON

Two recent acquisitions made by the United Carbon Company, Charleston, West Virginia, have placed that organization in one of the foremost positions in the carbon black industry, according to a report by Oscar Nelson, president, which accompanied the recently issued financial statement of the company for the year of 1934. He stated that the acquisitions referred to place the company in the van from the standpoint of both production and sales.

Early in December, 1934, United Carbon acquired three plants, two in Texas and one in Oklahoma, through the purchase of Texas Carbon Industries, Inc. The Oklahoma plant has two producing wells.

As of January 2, 1935, according to the president's report, purchase was made of the carbon black and natural gas properties of the Century Carbon Company, situated in the Monroe and Richland Fields, Louisiana, for the sum of $1,000,000 of which $150,000 was paid in cash and long term notes issued for the balance. Through the purchase of the Century properties United Carbon added a daily open flow of 41 million cubic feet from 26 wells.

RUBBER COMMITTEE D-11 MEETS IN PHILADELPHIA

An enthusiastic meeting was held in Philadelphia by Committee D-11 on Rubber products in connection with the Spring Group Meetings of the various committees of the American Society for Testing Materials the week of March 4 to 8. Reports of rubber sub-committees were made including a report of studies on the correlation and checking of several methods of hardness testing, the completion of a method for testing compression set of rubber under constant deflection, methods of accelerated aging tests for insulating tape, and a test program for improving the correlating test methods for testing friction and rubber insulating tape.

Four methods of dynamic fatigue testing applicable to testing tire carcasses and belts for ply separation and for flex cracking of vulcanized rubber, developed by the Sub-Committee on Dynamic Fatigue Testing, were presented and discussed. Further work was reported on accelerated aging tests for rubber products including the Geer oven and oxygen bomb tests. Development of reference standard rubber stocks in vulcanized form having certified physical properties which might serve as reference standards in abrasion and other tests was considered and a definite program adopted.

A number of physical testing revisions were considered as was a suggested outline for a Laboratory Test Manual which will be published later in the year. Many of the suggestions made at the meeting will be presented to the Society at the annual meeting in June at Detroit.

Plan Rubber Toy Exhibits

Several rubber manufacturers in and around Akron will be well represented at the coming American Toy Fair to be held in the Hotel McAlpin and the Toy Center, in New York City, from April 1 to 20, inclusive. Seiberling Latex Products Company, Barberton, will have two exhibit rooms featuring rubber creations depicting Walt Disney characters. Goodrich is planning a large exhibit of toy balls, inflatable toys and rubber dolls. Goodyear is said to be planning an exhibit of tires for toy vehicles.

DENY RUBBER IMPORTERS SEPARATE TRADE CODE

The petition of American rubber importers for a separate code of fair competition was officially denied by the National Recovery Administration on February 7 in a formal notice presented to the Rubber Trade Association of New York, Inc., which includes among its membership every rubber importer in the country. Under the terms of the ruling the trade has been placed under the importers' general code, with an understanding that there may be a supplemental agreement with appropriate provisions in the future.

The Rubber Trade Association started negotiations in 1933 for a separate code. On July 31, 1934, exemption was granted rubber importers from the general code under terms provided by the NRA relating to firms not participating in the writing of a code to which they object and granting a stay to such companies upon protest pending a hearing on their respective petitions. This exemption, on which a public hearing was held in Washington, D. C. on November 20, 1934 before the National Industrial Recovery Board, is automatically cancelled by the recent decision. The same board which presided at the public hearing is now considering the terms of a possible supplementary code.

Shortly after the NRA decision was made known it was reported that some members of the trade were dissatisfied with the outcome of negotiations. They argue that the trade is non-competitive with a domestic industry and that the product is even duty free. It is considered likely, however, that the rubber importers will become active under the general code. Their agreement as now drawn will be redrafted as a supplemental document and representation will be accorded on the general code authority.

The rubber importers, who have been represented in code negotiations by Fred B. Peterson, have contended from the beginning that they should be accorded recognition the same as dealers in tin and other basic products have been treated. Under the general code they will be grouped with importers of linens, china, glassware and other lines.

The Recovery Administration, it has been pointed out on the other hand, has endeavored to keep the import industry as much a unit as possible. Supplemental codes thereunder have been granted to the Oriental rug and linen trades, and now to the rubber interests. Even such agreements, however, are restricted in number and to avoid the necessity for adding to them the Administration is considering amendments proposed for the trade practice provisions in the general code to meet problems peculiar to the various groups and now covered in only a general way.

The general code has been under administration since last June by a temporary authority headed by Charles E. Bingham as chairman and Cordt Pfeiffer, vice chairman. Election of a permanent authority was completed last month and as soon as it is accorded recognition in Washington the twenty-seven members representing as many branches of import trade will organize.

Importers of crude rubber compose the second largest group of importers in the United States, so far as sales volume is concerned. According to available estimates rubber importers in 1933 reported sales amounting to $40,000,000.

10,000th Balloon Released

Pilot R. J. McNown of Northwest Airlines is seen here watching a charming miss release the 10,000th balloon for the Chicago Airport Weather Bureau recently, while government meteorologist E. D. Knarr prepares to follow the flight of the balloon through the "Theodolite" instrument. These rubber balloons, only a trifle larger than the ordinary rubber toy balloon, are used in obtaining weather data for transport pilots by the Department of Commerce Weather Bureau. They are filled with hydrogen gas which expands them to a diameter of 20 inches. The released balloon ascends at the rate of 600 feet per minute, its flight being followed by meteorologists through the "Theodolite" until lost to sight, with a reading taken every 1,000 feet noting the direction and velocity of the wind. (*Metropolitan News Photo.*)

General in Favorable Condition

According to Conrad Alexander, New York financial writer, in an analysis of the five leading tire companies, the General Tire & Rubber Company, Akron, is in a highly favorable condition. He reports the company "operates exclusively in the replacement trade where the profit margin is higher" under normal conditions. Stating that General operates on a smaller scale than the four larger tire companies, Mr. Alexander writes that General "has been able, through the depression, to more readily adjust itself to conditions." He also predicts a gain of approximately 2,000,000 tires over the 1934 figure of 32,000,000 in 1935 in the replacement tire market. General earnings in 1934 were equal to $5.79 on the common stock as against $2.67 in the preceding year.

Board Guides Pennsylvania

Since the resignation of W. O. Rutherford from the presidency of the Pennsylvania Rubber Company, Jeannette, Penna., active management of the company has been vested in the executive board. This board is comprised of A. C. Bowers, vice-president; C. G. Morrill, treasurer; H. C. Walthour, comptroller; and A. Koehler, sales manager. Each of these four executives have been associated with Pennsylvania Rubber activities for some time.

JANUARY CONSUMPTION 28.5% OVER DECEMBER

Consumption of crude rubber by manufacturers in the United States for the month of January amounted to 47,103 long tons, which compares with 36,662 long tons for December, 1934. January consumption shows an increase of 28.5% over December, 1934 and 19.9% over January, 1934, according to statistics released by The Rubber Manufacturers Association. Consumption for January, 1934, was reported to be 39,284 long tons.

Imports of crude rubber for January were 42,059 long tons, an increase of 44.0% above the December, 1934 figure of 29,200 long tons, but was 9.0% below the 46,204 long tons imported in January, 1934.

Total domestic stocks of crude rubber on hand January 31st amounted to 346,084 long tons, which compares with December 31, 1934 stocks of 352,632 long tons and 370,979 long tons on hand January 31, 1934.

The participants in the statistical compilation report 42,066 long tons of crude rubber afloat for the United States ports on January 31st, compared with 47,644 long tons afloat on December 31, 1934 and 45,768 long tons afloat on January 31, 1934.

January reclaimed rubber consumption is estimated to be 11,261 long tons; production, 10,465 long tons; stocks on hand, January 31, 1935, 22,291 long tons.

TIRE SHIPMENTS DROP 2.6% UNDER NOVEMBER

Shipments of pneumatic casings for the month of December, 1934 amounted to 3,108,552 casings, a decrease of 2.6% under November, 1934 and 12.0% below December, 1933, according to statistics released by The Rubber Manufacturers Association, Inc. Total shipments of pneumatic casings for the year 1934 amounted to 46,686,551 casings, an increase of 5.9% over 1933 and 16.0% over 1932.

Production of pneumatic casings for December, 1934 was 3,778,418 casings, an increase of 13.1% over November, 1934, and 22.6% above December, 1933. Total production of pneumatic casings for the year 1934 amounted to 47,232,745 casings, an increase of 4.3% over 1933 and 17.8% over 1932.

Pneumatic casings in the hands of manufacturers December 31, 1934 amounted to 9,454,985 units, an increase of 7.7% above stocks on hand November 30, 1934, and 6.4% over stocks on hand December 31, 1933.

The actual figures are as follows:

PNEUMATIC CASINGS

		Shipments	*Production*	*Inventory*
Dec.,	1934	3,108,552	3,778,418	9,454,985
Nov.,	1934	3,191,102	3,340,859	8,778,989
Dec.,	1933	3,531,121	3,081,886	8,888,070
Tot.,	1934	46,686,551	47,232,745	——
Tot.,	1933	44,093,712	45,304,230	——
Tot.,	1932	40,251,025	40,084,665	——

New Rubber Manufacturer

The Rubber Manufacturing Properties Company has been incorporated at Columbus, Ohio, for 250 shares of no par stock. Vorys, *et al*, of 52 Gay Street, Columbus, were the incorporating attorneys.

Dixiedensed

THE DUSTLESS BLACK

UNITED CARBON COMPANY

CHARLESTON, W. VA.

Kosmobile

THE DUSTLESS BLACK

UNITED CARBON COMPANY

CHARLESTON, W. VA.

Names in the News

A. G. PARTRIDGE, managing director of the Goodyear Tire & Rubber Company, Ltd., Wolverhampton, England, for the past six years, has been appointed vice-president of the Canadian Goodyear Company. E. J. THOMAS replaces him at the Wolverhampton factory.

E. B. FRIEDLANDER, of the Lowenthal Company, scrap rubber dealers of Chicago, has been nominated for president of the National Association of Waste Material Dealers, Inc.

GUY GUNDAKER, JR., has been named manager of the newly-created automotive accessories department of the B. F. Goodrich Company, Akron. For the past four years he has been manager of the sales promotion division, and has been with the company since 1924.

KARL KILBORN, head of the foreign plant service division, Seiberling Rubber Company, Akron, has left for England to promote the interests of the Avon India Rubber Company in the manufacture of Seiberling tires for Great Britain and her colonies.

W. F. GRADOLPH has been elected vice-president in charge of sales of the DeVilbiss Company, Toledo, Ohio. He has been with the company for the past twenty-four years.

F. A. STEELE, formerly superintendent of the Gadsden (Alabama) plant of the Goodyear Tire & Rubber Company, sailed for England on February 14 to take up new duties at the Wolverhampton factory of the company.

T. C. ENGLISH, associated with the B. F. Goodrich Company for the past fifteen years, the last six of which were spent as assistant sales manager of the Akron Sales Division, has resigned from the company and is now associated with the George Worthington Wholesale Hardware Company, of Cleveland, as manager of the industrial rubber goods department.

SIDNEY M. CADWELL, director of tire development research for the U. S. Rubber Company, with headquarters at Detroit, has taken over the presidency of the Detroit Section of the American Chemical Society.

HARRY S. BAUGHMAN, factory superintendent, Sun Rubber Company, Barberton, Ohio, has been elected president of the Barberton Republican Precinct Committeemen, a newly formed municipal organization.

J. W. SCHADE, director of research, B. F. Goodrich Company, addressed a group of company department heads on the importance of research in modern industry on February 19 in the conference room of the Akron factory.

A. B. NEWHALL, of the Hood Rubber Company, Inc., Watertown, Mass., was officially approved on February 23 as chairman of the Rubber Footwear Division of the Rubber Manufacturing Industry. He automatically becomes a member of the Rubber Manufacturers Code Authority.

KENNETH ROSENBERGER, a production foreman for the Goodyear Tire & Rubber Company, sailed on February 26 from San Francisco to take up new duties at the Goodyear Java factory. He will be in charge of crude rubber and compounding ingredients.

WILLIAM O'NEIL, JR., eldest son of the president of the General Tire & Rubber Company, Akron, was married last month to a Lynn (Mass.) society girl. Mr. O'NEIL is a student at Harvard Law School.

PAUL DILDINE, manager of factory standards, B. F. Goodrich Company, Akron, addressed members of the Stark County Foremen's Club on February 12 at Canton, Ohio, on the general subject of employe wages.

DON PARMELEE has resigned from his position as assistant paymaster of the Seiberling Rubber Company and is now associated with the Hall Trucking Company of Akron.

P. E. H. LEROY, vice-president and treasurer of the Goodyear Tire & Rubber Company, Akron, passed out the cigars on February 20, the occasion being a nine-pound girl born to Mrs. LeRoy.

M. R. SUTHERLAND, of the Retail Stores Department, Firestone Tire & Rubber Company, Akron, addressed members of the Akron Optimist Club on February 20, at the regular meeting of the club at the Mayflower Hotel.

B. J. BROOKS, operating manager, sales department, B. F. Goodrich Company, Akron, was elected president of the University Club, last month. GEORGE OENSLAGER, research chemist of Goodrich, was named second vice-president.

EARL H. BARDER, general superintendent, tire division, B. F. Goodrich Company, Akron, completed 25 years of service with the company last month. He was hired in 1905 by the Diamond Rubber Co.

T. J. BUTLER, president of the Texas Carbon Industries, Inc., was elected a director of the United Carbon Company on March 5 at the annual meeting of the latter concern which absorbed the Texas company recently.

C. P. BOONE has been appointed manager of wire sales of United States Rubber Products, Inc., on the Pacific Coast. His headquarters will be at the company's San Francisco branch.

P. C. HANDERSON, advertising and publicity director, B. F. Goodrich Company, Akron, has been named on the program committee of the Association of National Advertisers which will hold its 26th semi-annual meeting at White Sulphur Springs, Va., on May 5-8.

R. W. HADLEY, recently appointed general manager of the Goodyear Java factory now nearing completion, sailed from New York on February 27 to take up his new duties in the Dutch East Indies. He was accompanied by Mrs. Hadley and their four children.

KITCHEL ELECTED HEAD OF BINNEY & SMITH CO.

Allan F. Kitchel, formerly vice-president and sales director of the Binney & Smith Company, has been elected to succeed his late father-in-law Edwin Binney, as president of that company. Mr. Binney died in Florida on December 17.

Allan F. Kitchel

The new president is 49 years old, a native of East Liverpool, Ohio. He was graduated from Yale University in 1909, and has been associated with Binney & Smith since that date, devoting most of his activities to the selling end. He served his apprenticeship with the company at the West Virginia plant of the company.

Mr. Kitchel is married, his wife being the former Helen Binney. They have four children, two boys and two girls. The family home is in Old Greenwich, Connecticut, where Mr. Kitchel is a director of the Trust Company of Old Greenwich. He is also a member of the Board of Estimate and Taxation of Greenwich, and a member of many clubs, including the Yale, Riverside Yacht and Innis Arden Country clubs. He is also a director of the Columbian Carbon Company and has been for several years. He holds a commission as lieutenant colonel in the U. S. A. reserve infantry.

Other officers of the Binney & Smith Company now are S. V. Smith, chairman of the board; John Stead and Norman L. Smith, vice-presidents; and F. R. Cantzlaar, secretary-treasurer.

DR. B. J. LEMON, who has represented the U. S. Rubber Company at Detroit as Field Engineer for many years, has been transferred to the New York office at 1790 Broadway to engage in special work in cooperation with the local office.

H. V. BROWNE, office standards manager, and W. J. JAMES, auditor, of the B. F. Goodrich Company, Akron, have been "loaned" to Governor Davey of Ohio to participate in a survey of that state's government.

THE parents of LEE R. JACKSON, vice-president, Firestone Tire & Rubber Company, Akron, celebrated their golden wedding anniversary last month.

A. C. HORROCKS, director of the Goodyear Industrial University, addressed the Akron Real Estate Board at a sales conference held at the Mayflower Hotel on February 19.

J. W. LAMEY, packaging engineer, B. F. Goodrich Company, attended the Fifth Annual Packaging Exposition at Chicago the week of March 4.

Financial News

GOODYEAR'S 1934 PROFIT LOWER THAN 1933 REPORT

The disastrous results of tire price wars early in 1934 are reflected in the financial statement of the Goodyear Tire & Rubber Company, Akron, and subsidiaries, for that year. Despite the fact that net sales last year amounted to $136,800,764 as against $109,655,636 in 1933 the company reports net profit of $4,553,964 for 1934, considerably below that of $6,021,535 recorded for 1933. The net profit for 1934 was derived after deducting all charges, including $13,309,505 for Federal income and other taxes, but includes a profit of $266,279 on book values of foreign net current assets previously written down by charges to profit and loss.

The 1934 net profit is equal to $6.04 a share on 753,760 no par shares of $7.00 first preferred stock. Excluding the special profits 1934 earnings are equal to $5.69 on the preferred stock, against $5.44 paid in 1933. Payment of 47 cents a share was made, on the 1,943,769 no par shares of common stock, in 1933.

Goodyear directors also voted on February 18 to declare a quarterly dividend of $1.00 on the preferred stock, payable April 1 to stockholders of record on March 1. In the three previous quarters Goodyear has paid the same amount, but at this time last year the sum of $2.00 was paid because of accumulations in addition to the regular $1.00 payment.

Although balance sheet for 1934 is not yet completed a preliminary statement for the year shows a current ratio of 11.7 to 1 of current assets to current liabilities.

GOODRICH NETS PROFIT OF $2,534,679 IN 1934

Net profit for the B. F. Goodrich Company, Akron, and subsidiaries, for the year of 1934, amounted to $2,534,679, according to its financial statement issued after the regular monthly meeting of the board of directors held on February 13. This compares with the 1933 profit of $2,272,514, an increase of $262,165, and represents net profit after deducting all charges including deduction of profit applicable to subsidiary companies' capital stock not owned by Goodrich, and Federal taxes.

The report shows consolidated sales of $103,871,717 for 1934 compared with $79,293,495 in 1933, an increase in sales of $24,578,222 or 31%.

In 1934 special items consisting of profit on securities sold and gain in acquiring the companies' bonds and debentures below face value less other items not relating to normal operations of the year, amounted to $872,666, as against similar extraordinary gains of $2,425,678 during 1933. The improvement in the results from ordinary operations of the business therefore amounted to $1,815,177. No unrealized profit on Foreign Exchange was taken into profits during the year 1934.

Raw materials on hand and material content of unfinished and finished goods were valued at the lower of cost or market on December 31, 1934. Materials on commitment at the end of the year were contracted for at prices below the market on that date.

Total current assets amounted to $57,666,556 and current liabilities to $9,414,282 giving a ratio of 6.12 to 1. Cash, Foreign short term deposits and government securities amounted to $6,570,310.

MONSANTO CHEMICAL CO. NETS $2,771,629 PROFIT

Net profit of the Monsanto Chemical Company, St. Louis, for 1934, including its proportion of the undivided profits of controlled companies not consolidated, and uncontrolled companies, amounted to $2,771,629.29, according to Edgar M. Queeny, president. This is equal to $3.20½ a share on the 864,000 $10.00 par shares of capital stock outstanding, after giving effect to 100% stock distribution last April, as compared with payment of $2.57 a share in 1933 computed on the same basis.

Of the net profit recorded $2,638,040.17, or $3.05 per share, resulted from operations of the parent and wholly-owned subsidiary companies, according to the report. The President's annual report to stockholders will be published at an early date.

FISK RUBBER HAS PROFIT AMOUNTING TO $728,696.96

In its second annual report the Fisk Rubber Corporation, Chicopee Falls, Massachusetts, shows a net profit of $728,696.96 for the year ended December 31, 1934, after making provision for depreciation and Federal income taxes, the latter amounting to $1,461,848.00. This profit is equal to $1.16 per share on the common stock after deducting preferred dividends of $6.00 per share. In the preceding year Fisk Rubber reported for the period from May 20 to December 31, 1933, and showed a net profit of $1,279,765.

According to a statement by president E. D. Levy which accompanies the financial report, earnings in 1934 were unfavorably affected due to the fact that prices did not keep pace with increased costs of raw materials. He points out, however, that the net profit per dollar of sales in 1934 was larger than the percentages shown by many other tire manufacturers.

The percentage of net profit to net sales in 1934 was 7.1% based on sales of $10,228,760.76, an increase of $1,049,288.17 over 1933. Total current assets amount to $9,398,002.26 of which $2,027,625.41 is cash on hand or in banks.

In a separate statement Fisk Rubber reports a net loss for 1934 of $44,806 under the head of "export accounts in liquidation." This loss was transferred to reserves.

Raybestos-Manhattan Profit

Raybestos-Manhattan, Inc., Passaic, N. J., earned net income of $750,891.59 for the fiscal year of 1934, equivalent to $1.17 per share. Net income for 1933 was $685,198.61 which was equivalent to $1.07 per share. Current assets were shown as $7,722,694 against current liabilities of $771,409.31, a ratio of 10 to 1. According to the report the company has no banking or funded debt, or other capital obligations. Total assets amounted to $16,204,367.07.

UNITED STATES RUBBER SHOWS LOSS FOR 1934

United States Rubber Company, New York, reports a net loss of $543,608 after expenses, provisions for depreciation, taxes, and contingencies and other deductions. The company reported a net profit of $76,913 in 1933.

Net sales for 1934 amounted to $105,476,872, an increase of $17,150,260, or 19% above 1933. After deduction of interest and depreciation the net profit was $887,645. A reserve for Federal and income taxes plus additional charges caused a charge to surplus of $543,608 for the year.

United States Rubber Plantations, Inc., in a separate statement, shows a profit of $3,378,682 before provision for depreciation and amortization of $1,642,840 which resulted in a credit to surplus of $1,735,842 for the year. Production for the year is reported at 50,986,000 pounds, compared with 48,718,000 pounds in 1933.

The general statement points out that a number of manufacturing and selling subsidiaries were dissolved during 1934 in order to simplify the corporate structure. The major portion of such activities have been assumed by one subsidiary, United States Rubber Products, Inc. There were 62 corporations included in the 1933 consolidated statement; 16 of these have been eliminated to date and 15 more are in process of elimination. Total current assets are shown as $57,743,651, of which $10,979,721 is in cash.

Baldwin Has $69,427 Profit

Baldwin Rubber Company, Pontiac, Michigan, reports net income of $69,427 for the year of 1934 after deducting Federal taxes and other charges, as compared with net income of $48,964 reported for 1933, equal to $1.11 a share on 62,554 Class A shares and 78 cents a share on 62,551 shares, respectively, after giving effect to complete exchange of old Class A and B stocks for new Class A stock.

Profit for National Lead

National Lead Company, New York, of which Titanium Pigment Company, Inc., is a subsidiary, had a net profit of $4,200,188, after deducting all charges, for the year of 1934. This is equivalent to $8.37 a share on 271,500 shares of common stock outstanding at the close of the year, after dividend requirements on the preferred stock. In 1933 the company reported a net profit of $3,828,329, or $6.98 a share on outstanding common stock.

Profit for Canadian Goodyear

Goodyear Tire & Rubber Company of Canada, Ltd., and subsidiaries, reports net profit of $1,428,835 for the year of 1934, after depreciation, taxes and other charges were deducted. In 1933 the company showed a net profit of $1,377,476.

Firestone Pays Dividend

Firestone Tire & Rubber Company, Akron, paid dividends totaling approximately $750,000 on March 1 to holders of 6% preferred, Series A, stock. The payment was the regular quarterly dividend payable to stockholders of record as of February 15, 1935.

R. A. WITHERSPOON, formerly vice-president and general manager of the Shawinigan Chemicals, Inc., of Canada, has been elected president of that company.

UNITED CARBON COMPANY EARNS $1,452,939 IN 1934

United Carbon Company, Charleston, W. Virginia, and subsidiary companies, shows net profit of $1,452,939.46 for the year ending December 31, 1934, after deducting the usual charges including Federal taxes. This compares very satisfactorily with net income of $636,217 reported for the year of 1933. Net sales for 1934 totaled $5,631,613.42 of which $3,400,266.44 were carbon black sales.

At the end of the fiscal year United Carbon had total current assets of $2,996,710.84, of which $1,189,605.45 was cash, as compared with total current liabilities of $828,678.99, a ratio of more than 3 to 1. Other data included in the current financial report show that the company now operates 554 producing gas wells in all and produced 73,644,166 pounds of carbon black in 1934. It carries no bonded indebtedness.

Canadian Dunlop Has Loss

An operating loss of $74,813 for the year of 1934 was reported by the Dunlop Tire & Rubber Company of Canada, in a statement issued by A. B. Purvis, president of the company. Income from investments amounted to $36,264. The report showed $174,046 marked off for plant depreciation. Total deficit for the fiscal year was shown at $224,088 bringing the deficit of the company forward to $1,000,923.

Loss for Aetna Rubber

Aetna Rubber Company, Ashtabula, Ohio, reports a net loss of $107,880 for the year of 1934, after depreciation, taxes, interest, and other charges. The company reported a net loss in 1933 of $69,059.

General Atlas Campaign

General Atlas Carbon Company, New York, manufacturers of Gastex Carbon Black, has started a direct mail campaign to users of carbon black. The first direct mail piece is in a humorous vein and printed in two colors and depicts the automobile of yesterday in comparison to the modern car, together with the tremendous increase of rubber parts in the current models. The qualities of Gastex are discussed in the mailing piece, which was drawn by Norman Guthrie Rudolph.

Organize Canadian Thermoid Co.

The Thermoid Company, Trenton, N. J., controlling the Thermoid Rubber Company, and other subsidiaries, has announced the formation of Thermoid, Ltd., under a Dominion charter, as the company's Canadian subsidiary. Offices for the new company have been established at 47 Simcoe Street, Toronto, Canada. Arthur B. Dougall has been elected president of the Canadian concern. He was formerly in charge of Canadian sales, and has been associated with the company for many years.

Dayton Directors Re-elected

At the annual stockholders' meeting of the Dayton Rubber Manufacturing Company, on February 4, in Dayton, Ohio, all members of the board of directors were elected to serve another term. The board is comprised of John A. MacMillan, C. E. Hooven, A. L. Freelander, W. G. Pickrel and E. A. Baker.

Obituaries

Mrs. Samuel P. Colt

Mrs. Elizabeth M. Bullock Colt, wife of Col. Samuel P. Colt, former chairman of the board of the U. S. Rubber Company, died at her residence. Twin Beaches, Newport, Rhode Island, on February 19, after a long illness, in her seventy-seventh year. A member of one of the oldest Bristol families, her family dated from Colonial days. Her late husband was a director and member of the executive committee of the U. S. Rubber Company from its inception in 1882. He was elected president in 1901 and held that post until 1918 when he resigned to become chairman of the board of directors, a post he held until his death on August 13, 1921. Mrs. Colt is survived by two sons and three grandchildren.

William W. Martin

William W. Martin, assistant comptroller of the B. F. Goodrich Company, Akron, died at Tucson, Arizona, on March 3 at the age of 45. He had been with Goodrich since 1913 and had resided in the West since last November seeking to regain his health. Mr. Martin was born in Toledo and was graduated from a Cleveland business college. He headed the Societe Francaise Goodrich in France in 1927. He returned to Akron in 1933 as assistant comptroller. He leaves a widow and a son.

Frank V. Jemison

Frank V. Jemison, sales manager, Murray Rubber Company, Trenton, N. J., died at his home in Hamilton Square, N. J. on February 6. Death was attributed to a heart attack. Mr. Jemison was born at Kingston, N. J. 64 years ago, and was graduated from Peddie Institute. He had been sales manager for Murray for the past seventeen years. He was also treasurer of the Trenton Baptist Association and was a Mason. Burial was at Hightstown, N. J. He leaves a widow, son and daughter.

James Hardman

James Hardman, founder of the Hardman Rubber Company, of Belleville, N. J., died at Miami, Florida, on February 6, at the age of 87. Death was due to pneumonia. Born in Manchester, England, Mr. Hardman arrived in this country when a boy and worked with the Mason Locomotive Works for several years. In 1878 he founded the Hardman Rubber Company, retiring in 1917. He is credited with having invented various machines and processes for the manufacture of rubber products and also in perfecting molds. He was both a Mason and an Elk. His wife, daughter and three sons survive.

Orr H. Williams

Orr H. Williams, at one time general manager of the Lancaster Tire & Rubber Company, died after a long illness on February 17 at his home 226 Sixteenth Avenue, Columbus, Ohio. At the time of his demise Mr. Williams was president of an investment brokerage concern. Interment was made in Lilly Chapel, Columbus. He leaves a widow, four daughters and a son.

LINCOLN RUBBER PLANT IS DESTROYED BY FIRE

Plans are under way for the erection of a new and larger building to replace the factory of the Lincoln Rubber Company, at 941 Wooster Road, Barberton, Ohio, which was destroyed by flames on February 20. Damage was estimated at $25,000 and the fire was extinguished after a nine hour battle. The conflagration was caused by a static spark igniting the naphtha in a rubber cement tank which rapidly spread to other tanks in the building.

According to William F. Kelley, president and general manager of the company, construction on the new building, probably a three-story structure, will not be started for two or three months. He stated that it was unfortunate that the fire came when it did, although the loss was covered by insurance, in view of the fact that the company had just started to fill an order for one million pairs of rubber gloves, an order which would have kept the factory busy for a full year.

All manufacturing operations of the Lincoln Rubber Company have been shifted to the Kenmore (Ohio) branch where half of the force of the burned factory have been given employment.

Lowe Denied Tire Profits

Another setback was handed to Harry L. Lowe, of Eau Claire, Wisconsin, in his attempt to file suit against L. A. Laursen, inventor, of Akron, Ohio, for a share of the profits derived by the latter from the now famous "water cure" process in the manufacture of tires. Mr. Lowe petitioned the Ninth District Court of Appeals (of Ohio) for permission to sue Mr. Laursen in the common pleas court at Akron for $399,500, his alleged share of derived profits. The appeals court refused the petition on the grounds that the suit has already been decided in the Federal courts in favor of Mr. Laursen. The petitioner bases his claim on "valuable service rendered" in the completion of the "water cure" process.

Canada Adopts Dumping Duties

Rubber footwear, including rubber soled shoes, has been imported in such large quantities into Canada recently that the Minister of National Revenue, who has the arbitrary power to fix the fair market value of imported goods, has announced that dumping duties are to be applied against all foreign rubber footwear. This means that high tariff charges will be placed against all footwear imported into Canada from any country except those under British control or dominance. The measure is being invoked to protect Canadian industry and labor.

Confer on Japanese Competition

Five rubber manufacturers of Akron and Barberton conferred with John Eldridge, special examiner for the Federal Trade Commission, at a luncheon at Akron on February 27. Unfair competition charged to Japanese manufacturers was discussed in an effort to bring to light specific charges to place before the Commission at Washington. The rubber manufacturers represented at the luncheon were Goodrich, Goodyear, General, Sun Rubber and Seiberling Latex Products Company.

NEW ENGLAND NEWS

The Middletown Rubber Corp., has been organized in Middletown, Conn., in connection with the recent change of ownership of the Omo Manufacturing Co., in that city. The new corporation, which has leased several of the Omo buildings, is capitalized at $20,000. James J. Colt, of Newark, N. J., is president; Jacob Ansin, Dorchester, Mass., secretary, and Herman Epstein, Brooklyn, N. Y., treasurer. Directors are the officers and George Miller of Brookline, Mass.

Stockholders of the Goodyear Rubber Company, Middletown, Conn., makers of rubber footwear, re-elected the entire board of directors at the annual meeting on February 11. The directors are Harold S. Guy, Arthur V. McDowell, Francis A. Beach, Charles T. Davis, T. Macdonough Russell, John P. Bacon, Earle R. Hudson, Charles H. Wetherbee, Frederick B. Fountain and Charles M. Park.

Carl F. Siemon, veteran Bridgeport, Conn., rubber manufacturer, was re-elected president of the Plastic Molding Company, Sandy Hook, Conn., at the annual meeting of directors held on February 28. William T. Cole of Newtown continues as treasurer and George M. Stuart of Newtown as secretary.

Essex Wire Corp., Detroit, Mich., owner of the former New York Insulated Wire Company, Wallingford, Conn., is suing the town and borough of Wallingford in an effort to compel a reduction of tax assessments. A tax abatement granted the company was withdrawn when the company allegedly failed to keep its part of an agreement with the town to employ a specified number of persons. Since then the plant has been closed and machinery removed.

N. L. Holstein has filed a trade-name in Hartford for the Goodyear Rubber Flooring Company, 650 Main street. Mr. Holstein has operated the Holstein Rubber Products Company at that address for a number of years, specializing in rubber tile.

G. M. Williams, president of the Russell Mfg. Co., Middletown, Conn., has been chosen chairman of the Industrial Division of the Middletown Community Chest for the forthcoming campaign.

The Veterans' League of Jenkins Bros., Bridgeport, mechanical rubber goods, held its ninth annual dinner February 28 at the Stratfield Hotel, Bridgeport. Farnham Yardley, president of the company, presented medals and bars to a number of employes who have been with the company 25 years or more. Bernard J. Lee, plant manager, served as toastmaster. F. H. Braithwaite, rubber division sales manager, and Louis J. DeHolczer, rubber division superintendent, were among the guests of honor.

Dural to Make Rubber Tubes

Resuming operations after a shut-down of several weeks, announcement is made by the Dural Rubber Company, of Flemington, N. J., that it will shortly resume the manufacture of rubber tubes. J. A. MacEwan, well known figure in the rubber industry, has been made production manager of the company.

Goldlov New Rubber Company

The Goldlov Rubber Corporation, a new rubber manufacturing concern, has started operations at Fostoria, Ohio. At present the plant is operating two eight hour shifts daily and is said to be working almost at capacity. Production is confined to a complete line of rubber gloves. H. J. Spero is one of the Goldlov executives.

Farrel-Birmingham Re-elects

At the annual meeting of stockholders of the Farrel-Birmingham Company, Inc., held at Ansonia, Connecticut, on February 21, the entire directorate was re-elected. Following the stockholders' meeting the Board of Directors held a brief session and re-elected all incumbent officers. The company manufactures rubber machinery.

Chardon Secures Big Order

Chardon Rubber Company, of Chardon, Ohio, received an order on February 19, for one million feet of rubber tubing to be used in automobiles. It was not made known as to what automobile manufacturer, or organization, placed the order.

Waste Trade Convention

The 1935 convention of the National Association of Waste Material Dealers will be held at the Hotel Sherman, Chicago, from March 18 to 20, inclusive. The actual forum session will be held on Tuesday, March 19. General Hugh S. Johnson will be the principal speaker at the annual banquet.

Witco Adds Dustless Black

Wishnick-Tumpeer, Inc., of New York and Chicago, have added dustless black to the Witco list of carbon blacks for the rubber and other industries. According to the company the new black is produced and controlled under the same rigid system of testing and retesting conducted on its other carbon blacks. It is said that Witco Dustless Black meets the most exacting requirements of rubber manufacturers for a product of this type.

Issue Restriction Statistics

The International Rubber Regulation Committee, in charge of all restriction activities on rubber, with offices at Brettenham House, 5-6, Lancaster Place, Strand, London, W. C. 2, England, has announced the publication of a regular monthly periodical under the name of the "Statistical Bulletin." The first issue bears a January, 1935, date line. Copies are available to interested parties at a cost of 10 shillings for an annual subscription.

Set Safety Congress Date

The 24th Annual Safety Congress of the National Safety Council will be held in Louisville, Kentucky, on October 14-18 inclusive. The Rubber Section of the Council will devote two mornings to sectional problems and will hold the section luncheon which proved popular last year. Prominent safety men in the rubber industry will deliver addresses during the two-day session.

Elect Seiberling to A.N.A.

The Seiberling Rubber Company, Akron, has been elected to membership in the Association of National Advertisers, according to an announcement made last month by the latter organization. J. P. Seiberling, vice-president in charge of sales, will represent the company in Association activities.

LOS ANGELES NEWS

Approximately 100 people attended the social evening event sponsored by the women members or wives of members of the Southern California Section of the American Chemical Society at the Women's University Club, 943 South Hoover Street, February 23, the Rubber Division being well represented. Bridge was the principal diversion and a banquet was served.

Francis H. Banbury, inventor of the Banbury mixer, is spending a month in Southern California making his headquarters at The Biltmore Hotel in Los Angeles and at The Mission Inn at Riverside.

Dr. F. W. Stavely, former chairman of the Los Angeles Group of the Rubber Division of the American Chemical Society, has been transferred back to Los Angeles after two years spent in the East. Dr. Stavely is employed by the Firestone Tire and Rubber Company of California and has always been active in the affairs of the local groups, both social and professional.

April 20th is the tentative date set for the spring golf tournament of the Los Angeles Group of the Rubber Division of the American Chemical Society, but the golf course to be used has not yet been selected by the golf committee.

V. H. Cosler, technical sales representative of the E. I. du Pont de Nemours Company, Inc., spent a portion of the month of February in the Los Angeles area on business connected with his company.

A perpetual trophy has been purchased to accentuate interest in an inter-plant golf competition started during 1934, twenty players from each of "The Big Four" participating in four plays annually. The trophy goes to the team with the highest score at the end of the play year. "The Big Four" here means The Firestone Tire and Rubber Company of California; the United States Rubber Company, Samson Division; the Goodyear Tire and Rubber Company of California, and the B. F. Goodrich Rubber Company. The third play of the first year was held March 3, the year to end in June. Four different golf courses are being used in order that no team may have a permanent advantage through familiarity with any one course.

New Rubber Goods

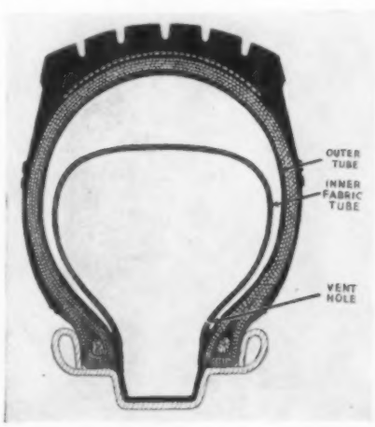
Armstrong Air Coaster Tire

Armstrong Rubber Company, Inc., West Haven, Conn., has introduced a new low pressure tire termed the Armstrong Air Coaster. The tread of this tire is said to

be the widest and flattest in the industry. The non-skid is in the center to provide for better traction. The Air Coaster has been built up at the shoulders into four solid riding bars which construction is stated to take up the wear at the point where the strain on the tire is greatest. Tests conducted by Armstrong engineers prove that the tire overcomes the tendency toward rapid and uneven treadwear. The Air Coaster is produced in 4 and 6 ply models, the latter insured to wear 18 months.

Goodyear Lifeguard Tube

Designed to prevent loss of car control when blow-outs occur Goodyear Tire & Rubber Company, Akron, recently introduced the Lifeguard tube. As indicated by the cross-sectional view of the tube,



reproduced herewith, the air enters the inner fabric tube through the valve, as in an ordinary tire, and then passes through the small vent hole into the space between the inner fabric tube and the outer tube. When the pressure in the inner and the outer space equalizes, the inner fabric tube floats free, while the outer tube is pressed tight against the shoe. Should a spike or other instrument pierce the shoe and outer tube, a blowout results, but only the air in the outer space is lost. Because of its floating condition, the inner fabric tube gives with the spike, and is not pierced; the air contained in the inner space meanwhile supports the tire. Since this air can escape only through the small vent, the tire remains inflated long enough to give the driver control of his car for over a mile after the blowout. This tube was demonstrated last month at Floyd Bennett Field in Brooklyn, N. Y.

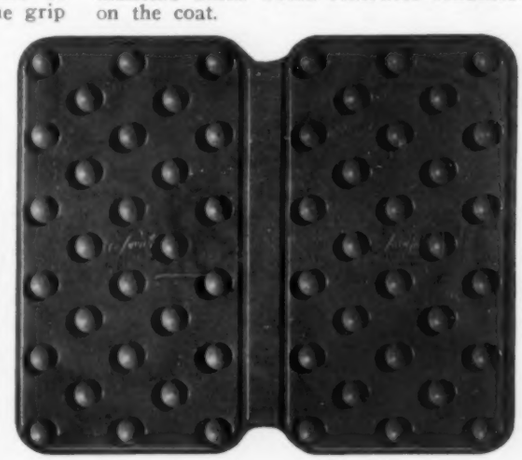
Miller "Popeye" Inflated Toy

Miller Rubber Company, Akron, Ohio, has designed and introduced a rubber "Popeye" inflated toy under exclusive license. The toy is an exact replica of the popular character in the syndicated newspaper cartoon including the one shut-eye

and the ever-present pipe stuck jauntily on the side of the mouth. The new inflated novelty is being nationally distributed. The company is manufacturing a line of inflated rubber balls also featuring "Popeye the Sailor."

Savafal Rubber Foot Grip

A new bath mat of different design and construction than any model yet presented to the market has been introduced by Rudolph, Healey & Scudder, Inc., New York City, under the tradename of Savafal Foot Grip. It is not designed for sitting purposes but to provide absolute security when arising from or getting into the bath tub. 56 suction cups on the bottom of the grip hold it firmly in place, while an apron around edge makes contact with tub and creates a water cushion. Savafal Foot Grip actually consists of two pads, one for each foot, joined together, with a hinge arrangement in the center to permit easy folding for convience when not in use. Folded they measure 7 x 12½ inches; opened for use they measure 12½ x 15 inches. A star and laurel leaf motif is used for decorative purpose, while a raised border supplies additional safety. Holes in both sections of the grip allow the water to drain off. Available in seven colors Savafal Foot Grips are cellophane-wrapped and packed in individual boxes.



Seamless Rubber Bathing Suits

Seamless Rubber Company, New Haven, Conn., is now showing its new line of Pale Crepe Bathing Suits which combine attractive appearance with practicality. A

new "pebble crepe" process is said to have produced a tough, durable fabric that gives longer wear. The suits are available in one and two piece ensembles and are attractively packaged. The 1935 line is known as the "Gulf Stream" bathing suit. The company's other bathing apparel includes rubber caps, capes and ladies' "Briefs," the latter for wear under bathing suits or outer garments for molding the figure.

Condensation-Proof Coat

The Raincoat Division of the Dunlop Rubber Company, Edmonton, London, England, has introduced a new rubber-proofed coat made by a special process designed to eliminate condensation. For two years the company has been experimenting with this process. The secret is said to lie in the lining, which is of loosely woven material, light, porous and holding within its mesh an extensive layer of air, by virtue of which the fabric is able to absorb the moisture which would otherwise condense on the coat.

MARKETS

RUBBER—COTTON AND FABRICS—CHEMICALS

NEW YORK, MARCH 9, 1935

Crude Rubber

FOR the first time since last May spot rubber touched a low of 11.87 on the Exchange on March 9. Top price reached since our last report on the Exchange was 13.35 on February 18, a substantial rise over the price of 12.89 on the preceding trading day February 16. This price rise was due to the announcement of the Supreme Court on the long awaited "Gold Clause" controversy. Since that date several erratic reports contributed to an almost steady decline including the drop in sterling exchange, the 75% production rate set for the second quarter of 1935 by the Restriction Committee, the denial of President Roosevelt with regard to his alleged statement that the dollar was too high in relations to debts, and finally recent unconfirmed rumors of a slash in price by leading tire manufacturers in the face of published statements concerning additional price increases. Prices on futures have suffered equally. Quotations in the outside market, Exchange, London and Singapore, follow:

As of March 9

Plantations—			
Ribbed Smoked Sheets—			
Spot	—	@	.12
March	—	@	.12
Apr.-June	—	@	.12⅛
First Latex, crepe spot	—	@	.12⅛
Amber Crepe, No. 2	—	@	.10½
Amber Crepe, No. 3	—	@	.10⅜
Amber Crepe, No. 4	—	@	.10¼
Brown Crepe, clean thin	—	@	.10½
Brown Crepe, rolled	—	@	.10⅜
Latex—			
Liquid Latex, per gal.	.52	@	.53
Paras—			
Up-River, fine	—	@	.09⅜
Acre Bolivian, fine	—	@	.09⅜
Balata—			
Block, Ciudad	—	@	.33

LONDON MARKET

Standard Smoked Sheets—Buyers—March 9			
March	—	@	6d
Apr.-June	—	@	6⅛d

SINGAPORE MARKET

Standard Smoked Sheets—Sellers—March 9			
March	—	@	5⅞d
Apr.-June	—	@	6⅛d

Reclaimed Rubber

Reports from reclaimers show that production has held at a fair level in the past month with plants operating at normal capacities. The latest available consumption figures show that the percentage of reclaim to crude rubber in January was 23.9 compared with 22.6 in December. Reclaimed prices are unchanged since our last report, quotations being as follows:

High Tensile			
Super-reclaim, black	.08¾	@	.09
High Tensile Red	.07	@	.07¼
Shoe			
Unwashed	.06½	@	.06¾
Washed	.08	@	.09
Tube			
No. 1 (Floating)	.13	@	—
No. 2 (Compounded)	.07½	@	.07¾
Tires			
Black	.05	@	.05¼
Black, selected tires	.05¼	@	.05½
Dark Gray	.06¼	@	.06½
White	.09¼	@	.09½
Truck, Heavy Gravity	.05½	@	.06
Truck, Light Gravity	.06	@	.06¼
Miscellaneous			
Mechanical blends	.04¼	@	.04½

Scrap Rubber

As a result of lessened demand from reclaimers activity in rubber scrap has been dull during the past month with collections by scrap dealers reported poor on account of current low prices. Inner tubes No. 2 are down ¼ cent with other prices unchanged as follows:

(Prices to Consumers)

Auto tire peelings	ton 17.00	@	19.00
Mixed auto	ton 7.50	@	8.50
Clean solid truck tires	ton 35.00	@	37.50
Boot and shoes	ton 20.00	@	21.50
Arctics, untrimmed	ton 17.50	@	18.50
Inner tubes, No. 1	lb. .07	@	.07½
Inner tubes, No. 2	lb. .03¼	@	.03⅜
Inner tubes, Red	lb. .02½	@	.02⅝

Cotton

As expected the decision of the Supreme Court in the "Gold Clause" case resulted in the strengthening of cotton prices in mid-February with a high for the month of 12.80 reached on February 18. The price hovered between 12.50 and 12.65 for the greater portion of trading days but developments in the last few days have caused a decline of some 30 points in both spot and future prices closing at 12.30 on March 9 for spot cotton. Although the Government has succeeded fairly well, through its loan and marketing policies, in achieving price stabilization, cotton gradually sagged in the last few days under long liquidation and southern and foreign selling inspired by sharp dips in the pound sterling. Increased liquidation in new crop deliveries caused sharp declines in cotton futures late last week, together with increased nervousness over Government policies not yet made clear. Net losses of 12 to 16 points in futures were recorded for these reasons. Quotations for middling uplands on the N. Y. Cotton Exchange follow:

	Feb. 9	March 9		
	Close	High	Low	Close
March	12.38	12.16	12.00	12.18
May	12.44	12.27	12.11	12.12
July	....	12.32	12.17	12.18

Tire Fabrics

(Prices Net at the Mill—Process Tax Included)

Peeler, carded, 23/5/3	lb. .35½	@	.36
Peeler, carded, 23/4/3	lb. .36½	@	.37
Peeler, carded, 15/3/3	lb. .33½	@	.34
Peeler, carded, 13/3/3	lb. .32½	@	.33
Egyptian, carded, 23/5/3	lb. .48	@	.48½
Egyptian, combed, 23/5/3	lb. .52	@	.52½
CHAFERS			
Carded, American, 1 7/16"	lb. .35½	@	.36
Carded, American, 1"	lb. .31	@	.32½
LENO BREAKER			
Carded, American, 1 7/16"	lb. .36	@	.36½
Carded, American, 1"	lb. .31	@	.32½

Sheetings

Count	Width	Weight			
48x40	36 in.	5.50	lb.	—	@ .05½
40x40	36 in.	6.15	lb.	—	@ .05
40x36	36 in.	6.50	lb.	—	@ .04⅞
48x48	40 in.	2.50	lb.	—	@ .11⅛
48x48	40 in.	2.85	lb.	—	@ .09⅝
56x60	40 in.	3.60	lb.	—	@ .08⅝
48x44	40 in.	3.75	lb.	—	@ .08
44x40	40 in.	4.25	lb.	—	@ .07

Ducks

Enameling	lb. .32	@	.37½
Belting and Hose	lb. .34	@	—
Single filling, A grade	lb. .16¾	@	.17¼
Double filling	lb. .17¾	@	.18¼

Closing Rubber Prices on New York Commodity Exchange, Inc.

No. 1 Standard Contract of 10 tons

FROM FEBRUARY 10 TO MARCH 10

Date	Spot	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Sales
Feb. 10															
11	13.00	13.01	13.08	13.16	13.25	13.31	13.38	13.47	13.56	13.66	13.75	13.83	13.92		302
12															
13	12.97	12.97	13.04	13.11	13.18	13.26	13.35	13.43	13.51	13.60	13.69	13.78	13.87		270
14	13.06	13.06	13.13	13.19	13.26	13.35	13.44	13.51	13.58	13.69	13.75	13.82	13.90		303
15	13.00	13.03	13.10	13.17	13.24	13.30	13.35	13.43	13.50	13.59	13.68	13.77	13.86		297
16	12.89	12.90	12.97	13.02	13.08	13.15	13.23	13.31	13.40	13.49	13.58	13.67	13.76		151
17															
18	13.35	13.35	13.42	13.49	13.56	13.63	13.71	13.79	13.88	13.97	14.06	14.15	14.24		946
19	13.07	13.08	13.15	13.21	13.28	13.35	13.43	13.52	13.61	13.69	13.77	13.86	13.95		618
20	13.06	13.07	13.14	13.22	13.30	13.37	13.45	13.53	13.62	13.70	13.78	13.87	13.96		292
21	13.06	13.05	13.12	13.20	13.28	13.34	13.40	13.49	13.59	13.62	13.73	13.83	13.92		505
22															
23	13.06	13.05	13.12	13.21	13.30	13.36	13.42	13.51	13.60	13.68	13.76	13.84	13.93		277
24															
25	12.94	12.88	12.95	13.02	13.10	13.18	13.26	13.34	13.42	13.50	13.59	13.68	13.77		609
26	12.48	12.47	12.54	12.61	12.68	12.65	12.83	12.92	13.01	13.08	13.15	13.23	13.32		971
27	12.58	12.58	12.65	12.72	12.79	12.85	12.91	12.98	13.07	13.15	13.23	13.31	13.39		804
28	12.59		12.64	12.69	12.75	12.82	12.89	12.97	13.06	13.14	13.22	13.30	13.39		185
Mar. 1	12.56		12.62	12.66	12.70	12.77	12.84	12.91	12.98	13.06	13.15	13.24	13.33	13.42	344
2	12.56		13.57	12.62	12.67	12.73	12.79	12.86	12.94	13.03	13.13	13.23	13.32	13.41	110
3															
4	12.28		12.37	12.41	12.45	13.52	12.60	12.66	12.73	12.80	12.88	12.96	13.05	13.13	454
5	12.04		12.12	12.15	12.19	12.25	12.32	12.39	12.47	13.55	12.63	12.72	12.80	12.88	578
6	11.85		11.87	11.91	11.96	12.02	12.09	12.17	12.25	12.32	12.39	12.47	13.55	12.63	787
7	12.00		12.05	12.10	12.16	12.24	12.32	12.39	12.46	13.53	12.60	12.67	12.74	12.81	490
8	12.07		12.09	12.14	12.19	12.24	12.30	12.38	12.47	13.54	12.61	12.70	12.78	12.86	171
9	11.87		11.91	11.96	12.01	12.07	12.14	12.22	12.30	12.38	12.46	13.55	12.64	12.73	125
10															

Rubber CHEMICAL Markets

NEW YORK, MARCH 11, 1935

[All Quotations F.O.B. Works Unless Otherwise Noted]

ACCELERATORS

Organic			
A-1 (Thiocarbanilid)	lb.	.21 @	.25
A-5-10	lb.	.33 @	.36
A-7	lb.	.53 @	.65
A-11	lb.	.60 @	.75
A-16	lb.	.55 @	.65
A-19	lb.	.56 @	.75
A-32	lb.	.70 @	.80
A-17	lb.	— @	—
Aldehyde ammonia, crystals	lb.	.65 @	.67
Altax	lb.	— @	—
Captax	lb.		
Crylene	lb.	.55 @	.65
paste	lb.	.45 @	.55
Di-Ortho-Tolyguanidine	lb.	.44 @	.47
Diphenylguanidine	lb.	.35 @	.37
Ethylidene aniline	lb.	.45 @	.47½
Formaldenyde aniline	lb.	.37½ @	.42
Guantal	lb.	.42 @	.51
Heptene	lb.	.40 @	—
Hexamethylene-tetramine	lb.	.37 @	—
Lead Oleate, No. 999	lb.	.11 @	—
Witco	lb.	.11 @	—
Lithex	lb.	.18 @	.20
Methylenedianiline	lb.	.36 @	.37
Monex	lb.	3.25 @	—
Oxynone	lb.	.68 @	.80
Phenex	lb.	.50 @	.55
Pipsolene	lb.	3.55 @	4.00
R & H 40	lb.	.40 @	.41
R & H 50	lb.	.40 @	.41
R-2	lb.	1.55 @	1.90
Safex	lb.	1.20 @	1.25
SPDX	lb.	.75 @	—
Super-Sulphur No. 1	lb.		
No. 2	lb.		
Thiocarbanilid, drums	lb.	.21 @	.25
Trimene	lb.	.75 @	—
base	lb.	1.20 @	—
Triphenylguanidine	lb.	.58 @	.60
Tuads	lb.		
Ureka	lb.	.62 @	1.00
Ureka B	lb.	— @	—
Ureka C	lb.	.58 @	.69
Vulcanex	lb.		
Vulcone	lb.		
Vulcanol	lb.		
Z-88-P	lb.	.48 @	.60
Zimate	lb.		
Inorganic			
Litharge, domestic	lb.	.06½ @	—
Magnesia, calcined, heavy	ton	60.00 @	65.00

COLORS

Blacks (See Compounding Materials)

Blues			
Prussian	lb.	.36 @	.38
Ultramarine	lb.	.10 @	.12
Browns			
Sienna, Italian	lb.	.06 @	'13
Umber, Turkey	lb	.04 @	.04½
Greens			
Chrome, light	lb.	.20 @	.30
medium	lb.	.21 @	.31
Chromium Oxide, bbl.	lb.	.22 @	.23
Guignet's Green	lb.	.70 @	—
Reds			
Antimony			
crimson, 15/7	lb.	.46 @	—
sulfur, free	lb.	.48 @	.60
Indian English	lb.	.09 @	.10
Domestic (Maroon)	lb.	.11 @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red, f.o.b. Easton	lb.	.09¼ @	—
Whites			
Cryptone CB, No. 21	lb.	.06 @	.06¼
Cryptone, No. 19	lb.	.06 @	.06¼
Lithopone			
Albalith, black label—11	lb.	.04½ @	.04¾
Azolith	lb.	.04½ @	.04¾
Rayox	lb.		
Titanium oxide	lb.	.17 @	.19
Titanox B	lb.	.06 @	.06½
Titanox C	lb.	.06 @	.06½
XX—20 Zinc Sulphide, bbls.	lb.	.10½ @	.10¾
XX—86 Zinc Sulphide, bbls.	lb.	.10½ @	.10¾
Zinc Oxide—American Process			
American Azo:			
ZZZ (lead free)	lb.	.05¾ @	.06
ZZ (leaded)	lb.	.05½ @	.05¾
Horsehead Lead Free Brand:			
Special—3	lb.	.05¾ @	.06
XX Red—4	lb.	.05¾ @	.06
XX Red—72	lb.	.05¾ @	.06
XX Red—78	lb.	.05¾ @	.06
XX Red—103	lb.	.05¾ @	.06
U. S. P.—X, bbls.	lb.	.12½ @	.12¾
Kadox, black label—15	lb.	.09⅜ @	.09⅝
Blue label—16	lb.	.08⅜ @	.08⅝
Red label—17	lb.	.07 @	.07¼
St. Joe, black label	lb.	.05¾ @	.06
green label	lb.	.05¾ @	.06
red label	lb.	.05¾ @	.06
Zinc Oxide—French Process			
Anaconda, lead free	lb.	.05¾ @	.06
Anaconda, selected lead free	lb.	.06 @	.06¾
Florence White seal—7 bbls.	lb.	— @	.10⅜
Green seal—8	lb.	.09⅜ @	.09⅜
Red seal—9	lb.	.08⅜ @	.08¾
Yellows			
Chrome	lb.	.15 @	.16
Ocher, dom. med.	lb.	.01½ @	.02

BLACKS

Arrow "Aerfloted" Specification	lb.	.0535 @	.0825
Bone, powdered	lb.	.05½ @	.12½
Carbon, compressed	lb.	.0535 @	.0825
uncompressed	lb.	.0535 @	.0825
"Certified," Cabot	lb.	.0535 @	.0825
Spherons	lb.	.0535 @	.0825
"Disperso"	lb.	.0535 @	.0825
Drop, bbls.	lb.	.05½ @	.14
"Excello," compressed	lb.	.0535 @	.0825
"Fumonex"	lb.	.03 @	.07
"Gastex"	lb.	.03 @	.07
Lampblack	lb.	.07 @	.12
"Micronex"	lb.	.0535 @	.0825
"Supreme"	lb.	.0535 @	.0825
Thermatomic—"P 33"	lb.	— @	—
"Thermax"	lb.	— @	—
United "Dixie" & "Kosmos"	lb.	.0535 @	.0825

COMPOUNDING MATERIALS

Aluminum Flake	ton.	21.85 @	24.50
Ammonia carbonate, lump	lb.	.10½ @	.12
Asbestine	ton	14.00 @	15.00
Barium carbonate (98-100%)	ton	56.50 @	61.50
Barium Dust	lb.	.05 @	.06
Barytes	ton	22.00 @	24.00
Basofor	lb.	.04½ @	—
Bentonite	lb.	.02 @	.03
Blanc fixe dry f.o.b. works	ton	70.00 @	75.00
Calcene	ton	35.00 @	43.00
Catalpo (fact.)	lb.	.02 @	—
Chalk, precipitated			
Suprex white, extra lt.	ton	60.00 @	75.00
heavy	ton	45.00 @	55.00
Clay, Kaolin, domestic	ton	7.50 @	15.00
Aerfloted, Suprex	ton	8.50 @	10.00
Congaree	ton	9.00 @	—
Dark Blue Ridge	ton		
Dixie	ton		
Dixie, Jr.	ton		
Lexington	ton	10.00 @	22.00
McNamee	ton		
Par	ton		
Tensulite		15.00 @	—
Witco	ton	8.50 @	9.00
Cotton Flock	lb.	.10½ @	.18
Glues, extra white	lb.	.28 @	.30
medium white	lb.	.14 @	.19
Kalite No. 1	ton	30.00 @	55.00
Kalite No. 3	ton	40.00 @	65.00
Magnesium carbonate	lb.	.08 @	—
Mica	ton	65.00 @	80.00
Rottenstone (powdered)	lb.	.02½ @	.05
Soapstone, powdered	ton	16.00 @	22.00
Starch, powdered	cwt.	3.56 @	3.76
Talc, domestic	ton	12.00 @	15.00
Pyrax A	ton		
Whiting, commercial	ton	17.00 @	18.00
English Cliffstone	ton	33.00 @	43.00
Sussex			
Witco	ton	15.00 @	—
Wood Flour	ton	18.00 @	30.00
Zinc Carbonate	lb.	.10½ @	.11
Zinc Stearate	lb.	.19 @	.21

MINERAL RUBBER

Black Diamond	ton	27.00 @	—
Genasco, solid (factory)	ton	25.00 @	27.00
Hard Hydrocarbon	ton		
Parmr, solid	ton	21.00 @	26.00
Pioneer, MR, solid	ton		
Pioneer-granulated	ton		

SPECIALTIES

Aromatics—Rodo	lb.		
Para-Dors No. 5145	lb.	2.00 @	—
Sunproof	lb.	.35 @	.37½
Sponge Paste	lb.	— @	.80
Tonox	lb.	.56 @	.60

SOFTENERS

Acids			
Acetic, 28%, bbls.	100 lb.	2.40 @	—
glacial, USP, bbls.	100 lb.	12.25 @	—
Nitric, 36 degrees	cwt.	5.00 @	6.00
Sulfuric, 66 degrees	ton	15.50 @	16.50
Acids, Fatty			
Laurex	lb.	.15 @	.16
Stearex	lb.	.08½ @	.13
Stearic, double pressed	lb.	.09 @	.14
Alkalies			
Caustic Soda, 76%	cwt.	3.60 @	3.75
Soda Ash, 58% C.L.	cwt.	2.52 @	—
Oils			
Corn, refined, bbls.	lb.	.12⅛ @	—
Cottonseed, crude	gal.	.093 @	.10
Cycline Oil	gal.	.15 @	.28
Degras (c.l. 100 bbls.)	lb.	.02¾ @	—
Less c.l. (10-25 bbls.)	lb.	.03 @	—
Lots less than 10 bbls.	lb.	.03¼ @	—
Fluxrite	lb.	.05½ @	.06½
Palm Lagos	lb.	.05 @	—
Niger	lb.	.04¾ @	—
Para-Flux	gal.	.17 @	—
Petrolatum, light	lb.	.02 @	.02½
Pigmentaroil, tank cars	gal.	.16 @	—
in drums	gal.	.22 @	.23½
Pine, steam distilled	gal.	.64 @	.65
dest. dist., drums	gal.	.40 @	.45
Rosin Oil, cmpd.	gal.	.40 @	—
Rubtack	lb.	.40 @	—
Seedine, c.l.	lb.	.07¼ @	—
Tackol	lb.	.08½ @	.18
Witco Palm Oil	lb.	.05 @	—
Witco Softener (f.o.b. wks.)	gal.	.15 @	—
Woburn No. 8, c.l.	lb.	.06 @	—
Wobonite, c.l.	lb.	.05 @	—
Resins and Pitches			
Pitch, Burgundy	lb.	.05 @	.06
coal tar	gal.	.05½ @	.06
hardwood	ton	20.00 @	25.00
pine, 200 lb. gr. wt.	bbl.	6.00 @	—
Rosin, grade K, 280 lb.	bbl.	6.00 @	—
Pigmentar, tank cars	gal.	.16 @	—
in drums	gal.	.22 @	.23½
R. S. L. Resin	lb.	— @	—
Retort Pine Tar, drums	bbl.	12.00 @	13.00
Solvents			
Acetone, pure	lb.	.11 @	.12
Alcohol, denatured, methanol, No. 1 bbls.	gal.	.29½ @	—
Benzene, 90%	gal.	.15 @	.24
Beta-Trichlorethane	gal.	— @	—
Bondogen	lb.	— @	—
Carbon, bisulfide	lb.	.05½ @	.06
Carbon, tetrachloride	lb.	.05 @	.05¾
Dichlorethylene	lb.	.29 @	—
Dipentene, cml., drums	gal.	.40 @	.41
Dryolene (f.o.b. Okla.)	gal.	.10 @	.10½
Ethylene dichloride	lb.	.05½ @	.06½
Gasoline, steel bbls.	gal.	.16 @	—
Naphtha, solvent	gal.	.26 @	.31
Plastogen	lb.		
Reogen	lb.		
Rub-Sol (f.o.b. Okla.)	gal.	.09 @	—
Trichlorethylene	lb.	— @	.09½
Turpentine, spirits	gal.	.54 @	—
dest. dist., drums	gal.	.45 @	—
Waxes			
Beeswax, white	lb.	.34 @	.37
Carnauba, yellow	lb.	.34 @	.36
Ceresin, white, dom.	lb.	.08 @	.11
Montan, crude	lb.	.10 @	.11
Ozokerite, black	lb.	.24 @	.25
green	lb.	.26 @	.30
Paraffin (c.l.—f.o.b. N. Y.)			
Yellow crude scale	lb.	.03¼ @	—
White crude scale 124/126	lb.	.03¼ @	—
Refined, 125/127	lb.	.04¼ @	—

ANTI-OXIDANTS

AgeRite, Gel	lb.		
HP	lb.		
Powder	lb.		
Resin	lb.		
White	lb.		
Albasan	lb.	.70 @	.75
Antox	lb.		
B-L-E	lb.	.57 @	.60
Flectol-H	lb.	— @	—
Flectol White	lb.	— @	—
Flectol B	lb.	— @	—
Neozone	lb.		
Oxynone	lb.	.66 @	.90
Retardex	lb.	.35 @	.40
Stabilite	lb.	.57 @	.62
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.55 @	.60

MOLD LUBRICANTS

Aresklene	lb.	— @	—
Cocoa Soapstock	lb.	.06 @	.08
Dipex	lb.	.06 @	.08
Rusco, f.o.b. Nitro	lb.	.12 @	.30
Sericite, f.o.b. N. Y.	ton	65.00 @	—
Soap Tree Bark, cut, sifted	lb.	.06 @	.08
Zip (Mold Wash)	lb.	— @	—

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.13¾ @	—
Black	lb.	.08½ @	—
White	lb.	.08 @	.12
Brown	lb.	.07 @	.11½
Duphax	lb.	.10 @	—

VULCANIZING INGREDIENTS

Sulfur Chloride, yellow (drs.)	lb.	.04 @	.04½
Sulfur flour.			
Refined, 100% pure (bags)	cwt.	3.45 @	—
Commercial (bags)	cwt.	1.95 @	2.80
Telloy	lb.		
Vandex	lb.		

Crude Rubber
Latex and Guayule
Reclaimed Rubber
Tires and Tubes

STATISTICS OF THE INDUSTRY

Rim Production
Automobiles
Gasoline
Cotton Prices

U. S. Imports and Exports of Crude Rubber

YEARS	Gross Imports: Long Tons	Gross Imports: Total Declared Value	Gross Imports: Average Declared Value per pound Cents	Re-exports: Long Tons	Re-exports: Total Declared Value	Re-exports: Average Declared Value per pound Cents	Net Imports: Long Tons
1922	301,076	101,843,188	15.10	4,809	1,921,828	17.84	296,267
1923	309,144	185,060,304	26.72	8,772	5,672,319	28.87	300,372
1924	328,056	174,231,331	23.71	10,309	6,057,637	26.23	317,747
1925	396,642	429,705,014	48.36	14,827	19,847,753	59.76	381,815
1926	413,338	505,817,807	54.63	17,671	22,470,583	56.77	395,667
1927	426,258	339,874,774	35.60	27,775	24,735,488	39.76	398,483
1928	439,731	244,854,973	25.03	32,159	18,128,361	25.17	407,572
1929	560,084	239,178,783	19.15	36,485	16,868,733	20.64	523,599
1930	482,082	139,134,330	12.89	30,205	9,316,205	13.77	451,877
1931	497,138	72,918,949	6.54	25,595	4,255,472	7.42	471,543
1932	409,584	31,936,459	3.47	20,929	2,015,612	4.30	388,655
1933	407,817	44,034,064	4.82	20,537	2,601,352	5.65	427,280
1934	449,322	97,898,519	10.06	23,848	5,770,109	11.23	425,615
1933:							
Mar.	27,936	1,867,657	2.98	1,127	86,216	3.42	26,809
April	20,240	1,291,136	2.85	798	70,111	3.92	19,442
May	26,002	1,694,963	2.93	1,842	189,451	4.59	24,894
June	22,900	1,780,495	3.47	1,276	156,168	5.46	21,624
July	44,625	4,293,111	4.29	1,419	219,945	6.92	43,206
August	44,257	5,391,709	5.44	2,205	302,132	6.12	42,052
Sept.	44,912	6,110,956	6.07	2,369	335,798	8.89	42,543
Oct.	44,474	6,115,330	6.14	2,669	397,167	6.64	41,805
Nov.	40,582	5,850,714	6.44	2,188	333,631	6.81	38,394
Dec.	39,461	5,869,556	6.75	1,888	293,690	6.94	37,573
1934:							
Jan.	47,963	7,403,123	6.89	1,975	352,116	7.96	45,988
Feb.	34,335	5,262,711	6.84	2,133	476,232	9.97	32,202
Mar.	41,119	6,765,173	7.34	2,947	583,313	8.83	38,172
April	43,841	8,232,746	8.37	2,814	588,453	9.18	41,027
May	48,494	10,001,239	9.21	2,389	544,212	10.17	46,105
June*	47,289	10,747,464	10.14	2,012	501,499	11.33	45,277
July	41,443	9,670,617	10.41	2,366	660,199	13.99	39,077
August	31,531	7,873,690	11.15	1,393	400,433	12.83	30,138
Sept.	31,074	8,293,859	11.92	1,665	474,446	12.72	29,409
Oct.	28,318	8,203,447	12.93	2,058	620,754	13.46	26,260
Nov.	36,325	10,470,076	12.87	1,230	327,672	11.89	35,095
Dec.	17,590	4,974,374	12.62	866	240,780	12.46	16,724
1935:							
Jan.	39,675	10,852,308	12.21	977	278,229	12.72	38,698

* Revised.

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All Quantities in Long Tons)

	Guayule Tons	Guayule Dollars	Balata Tons	Balata Dollars	Jelutong Tons	Jelutong Dollars	Liquid Latex (1) Tons	Liquid Latex (1) Dollars
1924	1,356	536,392	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,853	3,537,810
1926	4,305	2,362,096	354	327,213	7,263	3,127,757	3,388	4,680,386
1927	5,018	2,674,957	582	447,246	7,785	2,448,657	1,116	876,077
1928	3,075	1,755,685	731	430,855	7,552	2,540,059	4,167	2,185,579
1929	1,231	545,175	728	566,964	8,203	2,458,136	3,728	1,787,997
1930	1,096	347,388	501	422,684	5,907	1,403,244	4,449	1,506,804
1931	—	—	1,208	411,692	5,777	1,019,010	4,650	884,355
1932	—	—	708	147,403	4,607	616,596	5,085	601,999
1933	—	—	1,658	2,261,869	5,989	944,895	11,085	1,833,671
1934	402	75,349	1,054	438,209	4,988	943,752	13,070	3,633,253
1934:								
Jan.	—	—	98	43,932	766	169,966	1,126	239,054
Feb.	—	—	68	36,346	453	102,471	885	193,732
Mar.	51	9,464	145	51,080	25[illegible]	43,532	1,134	257,545
April	100	18,928	128	50,965	533	98,658	1,334	321,390
May	100	18,928	143	65,471	538	95,710	1,407	368,642
June	51	9,422	84	49,881	388	71,672	1,458	421,317
July	—	—	160	63,963	482	87,412	1,231	385,733
August	100	18,607	100	36,732	516	85,651	1,169	369,335
Sept.	—	—	48	14,415	259	47,542	936	312,967
Oct.	—	—	14	2,797	278	48,287	922	282,503
Nov.	—	—	60	20,169	332	60,904	887	296,447
Dec.	—	—	6	2,458	192	31,947	581	184,588
1935:								
Jan.	—	—	81	34,687	448	80,097	848	287,583

(1) Weight given in pounds of dry rubber contained in latex

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)

Figures on Monthly Basis

	1928	1929	1930	1931	1932	1933	1934	1935
Jan.	34,403	43,002	36,194	28,557	29,648	21,661	39,284*	47,103
Feb.	33,702	41,594	33,302	28,797	31,821	21,638	40,609	
Mar.	35,688	44,730	35,540	32,788	29,505	18,047	47,097	
Apr.	32,772	47,521	39,686	33,321	27,515	25,928	44,947	
May	37,333	49,233	39,386	37,817	30,957	44,074	43,012	
June	37,676	43,227	34,195	37,916	41,475	50,743*	40,241	
July	37,407	41,526	29,508	31,397	29,976	49,614*	32,647	
Aug.	42,927	38,274	30,850	27,586	23,721	44,428*	33,310	
Sept.	39,882	34,707	25,515	23,638	23,847	35,281*	30,352	
Oct.	40,857	34,800	27,516	22,277	22,286	31,543*	31,347	
Nov.	37,461	27,659	23,691	22,943	23,231	28,831*	34,842	
Dec.	31,232	25,531	21,687	21,409	18,015	28,757*	36,662	
Tot.	441,340	469,804	375,980	348,986	332,000	400,545*	455,479	

* Revised.

Figures on Quarterly Basis

Quarter	1926	1927	1928	1929	1930	1931	1932	1933
Jan./Mar.	94,301	99,216	103,558	128,565	101,610	89,652	85,309	64,326
Apr./June	87,109	103,242	103,500	139,292	112,229	107,755	92,643	125,126
July/Sept.	93,793	89,210	117,573	113,746	85,261	83,632	72,523	132,406
Oct./Dec.	83,212	80,860	117,597	84,872	72,020	65,645	64,145	94,198
Totals	358,415	372,528	442,227	466,475	371,120	346,684	314,620	416,056

Note—The quarterly figures are generally regarded as the most authentic; the monthly figures may be accepted as preliminary.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption Tons	Consumption % to Crude	Stocks*	Year	Production	Consumption Tons	Consumption % to Crude	Stocks*
1925	132,930	137,105	35.6	13,203	1930	157,967	153,497	40.8	22,000
1926	180,582	164,500	45.9	23,213	1931	133,351	124,126	33.9	19,257
1927	189,144	178,471	47.6	24,980	1932	75,608	77,504	23.4	16,354
1928	208,516	223,000	50.4	24,785	1933	99,560	81,602	19.9	20,746
1929	218,954	226,588	48.4	27,464	1934	110,010	100,597	22.3	23,079
1934:									
Jan.	9,828	7,000	17.8*	24,263	July	9,446	8,175	25.0	24,926
Feb.	9,504	7,646	18.8	23,356	Aug.	8,160	8,493	25.5	24,607
Mar.	11,479	9,683	20.6	25,113	Sept.	6,974	7,028	23.2	24,540
Apr.	10,185	9,387	20.9	22,033	Oct.	8,145	8,167	26.1	24,511
May	10,848	9,500	22.1	22,887	Nov.	7,268	7,775	22.3	23,999
June	10,820	9,459	23.5	23,664	Dec.	7,353	8,284	22.6	23,079
1935:									
Jan.	10,465	11,261	23.9	22,291	July	.....	.....	...	.....
Feb.	.....	.....	...	.....	Aug.	.....	.....	...	.....
Mar.	.....	.....	...	.....	Sept.	.....	.....	...	.....
Apr.	.....	.....	...	.....	Oct.	.....	.....	...	.....
May	.....	.....	...	.....	Nov.	.....	.....	...	.....
June	.....	.....	...	.....	Dec.	.....	.....	...	.....

* Stocks on hand at the end of month or year.
* Revised.
(Rubber Manufacturers' Association figures raised to 100%)

U. S. Consumption of Gasoline

(In Thousands of Barrels of 42 Gallons)

	1933*	1934	1935		1932	1933*	1934
January	26,397	29,416	28,062	August	35,706	37,400	38,933
February	23,320	25,048		September	33,828	34,580	34,877
March	28,123	30,528		October	32,680	33,022	37,544
April	29,791	32,735		November	29,895	30,312	34,839
May	33,709	38,141		December	27,110	28,572	30,486
June	37,699	36,296					
July	34,087	37,393		Total	373,900	377,003*	406,267

* Revised on basis of final 1933 figures issued September 26, 1934 by Bureau of Mines.

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
1932																																
November	3 7/8	3 1/2	3 3/8	3 3/8	3 1/4																											3 5/8
December	3 3/4	3 3/4	3 3/8																													3 1/4
1933																																
January			3 3/4	3 3/8	3 3/8	3 1/4	2 11/16		3 3/8	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4	3 3/4	3	3 11/16	2 11/16	3	3 1/2	3 1/2	2 11/16	3	3 1/4	3 1/4	3 1/4	2 11/16	2 11/16	2 11/16	2 11/16		3
February			2 11/16	2 11/16		3			3					3				2 11/16		3 1/4												3
March			3															3 1/16														3 1/4
April			2 7/8		2 11/16	3 1/16	3											3 1/16														3 1/4
May			3 1/16	3	3 1/16	3 1/16	3	3 1/16		3 1/16	3 1/16							4 1/16														5
June			4 5/8	4 5/8	4 1/16	3 1/16												4 1/16														6 1/16
July			4 7/8		4 1/16	3 1/16												4 1/16														6 1/16
August			6 1/2	6 1/2	6 1/16	5 7/8												5 1/16														7 1/16
September			6 3/4		6 1/16	5 7/8												5 1/16														7 1/16
October			6 7/8		6 1/16	5 7/8												5 1/16														7 1/16
November			7 1/4		6 1/16	5 7/8												5 1/16														7 1/16
December			7 1/4		6 1/16	5 7/8												5 1/16														7 1/16
1934																																
January			7 5/8		6 1/16	5 7/8												5 1/16														7 1/16
February			7 5/8		6 1/16	5 7/8												5 1/16														7 1/16
March			7 5/8		6 1/16	5 7/8												5 1/16														7 1/16
April			7 5/8		6 1/16	5 7/8												5 1/16														7 1/16
May			7 5/8		6 1/16	5 7/8												5 1/16														7 1/16
June			7 5/8		6 1/16	5 7/8												5 1/16														7 1/16
July			7 5/8		6 1/16	5 7/8												5 1/16														7 1/16
August			7 5/8		6 1/16	5 7/8												5 1/16														7 1/16
September			7 5/8		6 1/16	5 7/8												5 1/16														7 1/16
October			7 5/8		6 1/16	5 7/8												5 1/16														7 1/16
November			7 5/8		6 1/16	5 7/8												5 1/16														7 1/16
December			7 5/8		6 1/16	5 7/8												5 1/16														7 1/16
1935																																
January			7 5/8		6 1/16	5 7/8												5 1/16														7 1/16
February			7 5/8		6 1/16	5 7/8												5 1/16														7 1/16
March			7 5/8		6 1/16	5 7/8												5 1/16														7 1/16

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1910-1929

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1910	206.60	1914	65.33	1918	60.15	1922	17.50	1926	48.50
1911	141.30	1915	65.85	1919	48.70	1923	29.45	1927	37.72
1912	121.60	1916	72.50	1920	36.30	1924	26.20	1928	22.48
1913	82.04	1917	72.23	1921	16.36	1925	72.46	1929	20.55

Average Monthly Price per Pound Since 1928

	1929 Cents	1930 Cents	1931 Cents	1932 Cents	1933 Cents	1934 Cents	1935 Cents
Jan.	20.14	15.24	8.34	4.38	3.08	9.32	13.10
Feb.	23.7	15.85	7.70	4.03	2.95	10.45	12.92
Mar.	24.55	15.34	7.71	3.35	3.01	11.01	
Apr.	21.18	14.93	6.43	3.02	3.56	12.10	
May	21.46	14.24	6.49	3.09	4.95	13.26	
June	20.64	12.45	6.35	2.66	6.15	13.51	
July	21.30	11.24	6.37	2.89	8.01	14.60	
Aug.	20.59	9.96	5.38	3.63	7.31	15.47	
Sept.	20.37	8.28	5.08	3.84	7.30	15.36	
Oct.	19.67	8.20	4.87	3.65	7.64	13.96	
Nov.	16.62	9.01	4.65	3.44	8.66	13.04	
Dec.	16.12	9.05	4.64	3.24	8.87	12.98	
Average for Year	20.55	11.98	6.17	3.49	5.96	12.92	

London Closing Prices of Ribbed Smoked Sheets

(In Pence Per Pound)

Day	Dec.	Jan.	Feb.	Mar.	Day	Dec.	Jan.	Feb.	Mar.
1	6 3/16		6 1/16	6 7/16	17	6 1/16	6 1/16		
2		6 3/16	6 1/16	6 1/4	18	6 1/4	6 3/16	6 1/4	
3	6 1/16	6 1/16			19	6 1/4	6 1/16	6 3/16	
4	6 1/16	6 5/16	6 1/16	6 7/16	20	6 1/4		6 3/16	
5	6 1/16	6 5/16	6 1/16	6 1/4	21	6 1/16	6 1/4	6 3/16	
6	6 3/16		6 1/16	6 1/16	22		6 1/16	6 1/2	
7	6 1/16	6 5/16	6 1/16	6	23		6 1/4	6 1/2	
8	6 3/16	6 1/4	6 3/16	6 1/16	24		6 1/4		
9		6 5/16	6 1/16	6	25		6 1/4	6 3/16	
10	6 1/16	6 5/16			26		6 1/16	6 1/16	
11	6 1/4	6 1/16	6 1/16		27	6 1/16		6 1/4	
12	6 1/4	6 1/16	6 1/4		28	6 1/16	6 1/16	6 1/16	
13	6 1/16		6 1/4		29	6 1/16			
14	6 1/16	6 1/16	6 3/16		30		6 1/2		
15	6 1/16	6 1/2	6 1/16		31	6 3/16	6 1/16		
16		6 3/16	6 1/4						

Average Monthly Price Per Pound

Month	1932 Pence	1933 Pence	1934 Pence	1935 Pence	Month	1932 Pence	1933 Pence	1934 Pence	1935 Pence
Jan.	3.052	2.264	4.429	6.434	Aug.	2.654	3.811	7.401	
Feb.	2.760	2.093	4.920	6.292	Sept.	2.485	3.728	7.409	
Mar.	2.047	2.099	5.136		Oct.	2.425	3.957	6.806	
Apr.	1.876	2.323	5.712		Nov.	2.518	4.096	6.294	
May	1.825	2.966	6.207		Dec.	2.444	4.200	6.295	
June	1.750	3.392	6.245		Average for Year	2.434	3.233	6.159	
July	1.875	3.860	7.053						

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Date	Jan.	Feb.	Mar.	Date	Jan.	Feb.	Mar.	Date	Jan.	Feb.	Mar.
1		12.55	12.60	11	12.70	12.55		21	12.70	12.65	
2	12.85	12.45	12.60	12	12.65			22	12.65		
3	12.85			13		12.55		23	12.65	12.55	
4	12.85	12.50	12.55	14	12.65	12.55		24	12.65		
5	12.75	12.55	12.55	15	12.55	12.65		25	12.65	12.55	
6		12.50	12.50	16	12.60	12.65		26	12.65	12.50	
7	12.85	12.55	12.50	17	12.75			27		12.65	
8	12.90	12.65	12.45	18	12.60	12.80		28	12.60	12.55	
9	12.85	12.60	12.30	19	12.65	12.65		29	12.55		
10	12.80			20		12.65		30	12.60		
								31	12.60		

Average Monthly Price Per Pound

	1932 Cents	1933 Cents	1934 Cents	1935 Cents		1932 Cents	1933 Cents	1934 Cents	1935 Cents
Jan.	6.65	6.23	11.25	12.70	Aug.	7.43	9.55	13.40	
Feb.	6.85	6.05	12.28	12.58	Sept.	6.30	9.64	13.00	
Mar.	6.86	6.39	12.30		Oct.	6.30	9.58	12.48	
Apr.	6.16	7.02	11.80		Nov.	6.22	10.04	12.53	
May	5.72	8.64	11.44		Dec.	6.00	10.17	12.76	
June	5.02	9.47	12.20		Average for Year	6.41	8.63	12.36	
July	5.87	10.76	12.84						

World Stocks of Crude Rubber

ON HAND OR AFLOAT TO THE U. S.

At End of	ON HAND 1933	ON HAND 1934	ON HAND 1935	AFLOAT 1933	AFLOAT 1934	AFLOAT 1935	ON HAND AND AFLOAT 1933	ON HAND AND AFLOAT 1934	ON HAND AND AFLOAT 1935
Jan.	396,376	368,660	346,084	32,539	45,768	42,066	428,915	414,428	388,150
Feb.	381,794	357,094		32,898	53,063		414,692	410,157	
Mar.	390,135	353,242		29,531	54,722		419,666	405,786	
Apr.	382,167	351,981		30,745	56,251		412,912	408,232	
May	364,623	351,329		43,342	57,921		407,965	409,250	
June	333,954	358,149		63,608	46,698		397,562	404,847	
July	326,609	364,883		57,435	45,869		384,044	410,752	
Aug.	325,148	362,647		53,084	40,278		378,232	402,925	
Sept.	334,637	359,667		57,255	38,831		391,982	398,498	
Oct.	343,579	362,018		58,568	38,247		402,147	400,265	
Nov.	353,852	361,236		57,140	38,625		410,992	399,861	
Dec.	364,541	352,632		55,606	47,644		419,147	400,276	

(Rubber Manufacturers' Association figures raised to 100%)

STOCKS IN GREAT BRITAIN

Stocks in London

(No. of Tons in Wharves and Warehouses, including Latex)

At end of	1933	1934	1935	At end of	1933	1934	1935
Jan.	36,481	38,570	81,807	July	41,178	50,490	
Feb.	37,182	38,752		Aug.	39,480	48,953	
Mar.	40,689	40,501		Sept.	39,237	56,103	
Apr.	40,911	42,413		Oct.	37,101	63,079	
May	41,998	42,190		Nov.	36,139	67,656	
June	43,032	45,674		Dec.	35,615	72,285	

At End of Recent Weeks

	First Saturday	Second Saturday	Third Saturday	Fourth Saturday	Fifth Saturday
1934					
Oct.	57,272	59,469	61,043	62,058	
Nov.	64,232	65,728	67,109	67,088	
Dec.	67,901	69,337	70,256	71,849	72,314
1935					
Jan.	73,407	75,821	78,138	79,530	
Feb.	82,160	83,622	85,202	87,222	
Mar.	88,097				

Stocks in Liverpool

1934				
Oct.	54,944	55,266	57,414	57,944	
Nov.	58,380	59,616	60,281	60,543	
Dec.	60,164	60,125	62,243	62,573	62,617
1935					
Jan.	63,132	65,099	65,977	65,768	
Feb.	66,429	67,043	67,846	68,243	
Mar.	68,266				

STOCKS IN PENANG AND SINGAPORE

(Stocks held by Dealers—Quantities in Long Tons)

End of	1932	1933	1934	1935	End of	1932	1933	1934	1935
Jan.	48,850	22,525	40,405	50,588	July	17,017	36,972	65,099	
Feb.	46,954	21,530	41,884		Aug.	20,649	38,601	59,227	
Mar.	46,591	24,594	47,933		Sep.	20,415	36,948	54,905	
Apr.	39,663	25,460	48,431		Oct.	23,158	37,282	54,155	
May	38,690	29,822	76,393		Nov.	25,419	39,018	49,282	
June	19,770	34,676	73,218		Dec.	25,341	38,269	51,255	

STOCKS IN OTHER CENTRES

End of: 1934	Malaya Mainland	Afloat for Europe	Holland	Colombo	Para and Manaos
Jan.	36,788	39,250	1,115	7,271	3,305
Feb.	39,630	36,563	906	5,366	3,420
Mar.	37,275	33,365	904	4,083	3,519
Apr.	33,765	32,640	905	4,070	3,624
May	7,213	39,370	897	3,066	3,556
June	20,243	36,870	902	3,533	3,273
July	27,235	35,430	1,263	4,683	3,094
August	30,507	36,060	1,322	5,713	2,849
Sept.	33,661	39,630	1,290	5,137	3,075
Oct.	31,762	40,560	1,401	5,675	3,113
Nov.	33,590	39,870	1,404	5,631	3,081
Dec.	23,173	45,000	1,326	5,732	3,293
Jan., 1935	33,609	40,000			

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total		Total		Total
1924	21,863,311	1928	24,247,282	1932	6,261,336
1925	26,001,664	1929	24,141,502	1933	8,713,962
1926	24,199,524	1930	17,364,096	1934	12,255,118
1927	19,700,003	1931	11,253,800	1935	

1935:		1934:		1934:	
January	1,868,723	May	1,140,132	September	526,472
February	1,616,398	June	1,015,730	October	629,878
March		July	1,155,024	November	577,713
April		August	752,074	December	1,199,240

U. S. Tire and Tube Statistics[1]

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Figures for Recent Years

	1927	1928	1929	1930	1931	1932	1933	1934
Production	64,439	77,944	68,726	50,965	48,739	40,085	45,304	47,233
Shipments	64,059	74,296	69,395	53,638	48,151	40,260	44,094	46,687
Inventory [2]	10,264	13,624	11,838	9,003	7,775	7,644	8,888	9,455

Figures for Recent Months

	PRODUCTION 1932	PRODUCTION 1933	PRODUCTION 1934	SHIPMENTS 1932	SHIPMENTS 1933	SHIPMENTS 1934	INVENTORY 1932	INVENTORY 1933	INVENTORY 1934
Jan.	3,462	2,258	3,922	3,253	2,597	3,222	7,912	7,237	9,684
Feb.	3,871	2,339	4,335	2,553	2,292	3,285	9,172	7,377	10,725
Mar.	3,671	2,038	5,180	2,954	2,092	4,223	9,878	7,290	11,651
Apr.	3,517	3,123	4,470	3,698	3,654	4,438	9,846	6,778	11,981
May	3,820	5,189	4,456	4,258	5,180	5,332	9,379	6,760	11,127
June	5,643	6,100	4,342	10,065	6,305	5,228	4,999	6,615	10,219
July	3,617	5,714	3,353	2,404	5,497	4,157	6,203	6,844	9,437
Aug.	3,089	4,994	3,533	2,655	4,707	4,308	6,659	7,070	8,697
Sept.	2,539	3,999	2,936	3,082	3,503	3,183	6,096	7,595	8,419
Oct.	2,569	3,249	3,287	1,799	2,537	3,010	6,876	8,462	8,657
Nov.	2,304	3,039	3,341	1,711	2,197	3,191	7,454	9,247	8,779
Dec.	1,983	3,082	3,778	1,819	3,531	3,109	7,644	8,888	9,455

AUTOMOBILE INNER TUBES

Figures for Recent Years

	1927	1928	1929	1930	1931	1932	1933	1934
Production	70,823	80,180	68,829	52,420	48,333	36,891	42,546	46,228
Shipments	72,896	77,127	70,592	54,938	50,021	37,911	41,391	45,046
Inventory [2]	13,692	16,117	12,807	9,999	7,922	6,749	7,815	9,180

Figures for Recent Months

	PRODUCTION 1932	PRODUCTION 1933	PRODUCTION 1934	SHIPMENTS 1932	SHIPMENTS 1933	SHIPMENTS 1934	INVENTORY 1932	INVENTORY 1933	INVENTORY 1934
Jan.	3,308	2,093	3,530	3,529	2,535	3,199	7,719	6,197	8,403
Feb.	3,281	2,224	4,077	2,728	2,102	3,323	8,760	6,357	8,445
Mar.	3,502	1,883	5,194	2,686	1,902	4,118	9,448	6,369	10,244
Apr.	3,225	2,853	4,735	3,385	3,051	4,342	9,441	6,189	10,585
May	3,820	5,189	4,359	4,258	5,180	4,902	9,379	6,760	10,043
June	5,279	5,448	4,097	9,019	5,778	5,309	5,174	6,097	8,795
July	2,937	5,603	3,531	2,160	5,211	4,323	5,975	6,440	8,053
Aug.	2,748	4,916	3,680	2,503	4,687	4,198	6,127	6,628	7,555
Sept.	2,601	3,827	3,110	3,098	3,472	3,024	5,753	7,008	7,639
Oct.	2,187	3,506	3,219	1,658	2,676	2,689	6,214	7,831	8,151
Nov.	2,005	2,863	3,169	1,578	2,103	2,767	6,662	8,625	8,503
Dec.	1,779	2,631	3,503	1,724	3,410	2,850	6,749	7,815	9,180

(1) Rubber Manufacturers' Association figures, raised to 100%. The Association estimates its figures to be 75% complete up until 1929 and 80% complete for 1929-1933. Beginning 1934, the Association reported its figures to be 97% complete.

(2) Held by manufacturers at end of period indicated.

Automobile Production

	United States Total	United States Passenger Cars	United States Trucks	Canada Total	Canada Passenger Cars	Canada Trucks	Grand Total
1928	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933*	1,920,057	1,573,512	346,545	65,924	53,855	12,069	1,992,126
1934	2,778,739	2,190,099	588,640	116,890	92,538	24,352	2,895,629
1934							
Jan.*	156,907	113,652	43,255	6,904	4,946	1,958	163,811
Feb.*	231,707	187,666	44,041	8,571	7,101	1,470	240,278
Mar.*	331,263	274,738	56,525	14,180	12,272	1,908	345,443
Apr.*	354,745	289,031	65,714	18,363	15,451	2,912	373,108
May*	331,652	273,765	57,887	20,161	16,504	3,657	351,813
June*	308,065	261,852	46,213	13,905	10,810	3,095	321,970
July*	266,576	223,868	42,708	11,114	8,407	2,707	277,690
August*	234,810	183,500	51,310	9,904	7,325	2,579	244,714
Sept.*	168,871	123,909	44,962	5,579	4,211	1,368	174,450
Oct.*	132,491	84,503	47,988	3,780	2,125	1,655	136,271
Nov.*	78,465	45,556	32,909	1,697	1,052	645	80,162
Dec.	183,187	128,059	55,128	2,732	2,334	398	185,919
1935							
Jan.	292,765	229,199	63,566	10,607	8,269	2,338	303,372

* Revised.

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA [1]								DUTCH EAST INDIES [6]						
	Gross Exports	Gross Exports Minus Imports	Ceylon [2]	India & Burma [3]	Sarawak [4]	British North Borneo [5]	Siam [4]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Indo-China [3]	Amazon Valley	All Other [6]	World Total [7]
1923	252,816	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,415
1924	259,706	108,524	151,182	39,997	7,657	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	514,487
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,530
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,970	10,782	10,309	6,781	4,251	69,755	79,396	115,254	7,665	14,260	5,651	814,241
1931	519,740	125,506	394,234	61,769	8,470	10,451	6,247	4,218	75,952	87,747	116,009	11,696	12,121	3,296	792,203
1932	478,252	92,539	385,713	48,973	3,888	6,960	4,664	3,451	61,312	79,837	85,871	13,883	6,450	1,816	702,818
1933	573,412	167,377	406,035	63,351	4,527	10,874	7,555	7,765	73,851	91,861	149,659	18,394	9,883	2,737	846,312
1933:															
March	42,153	7,964	34,189	4,905	389	571	458	304	5,092	6,466	6,999	1,102	995	103	61,573
April	36,823	7,758	29,065	4,582	272	624	583	235	5,226	5,969	8,147	1,122	556	183	56,564
May	42,917	13,664	29,253	4,643	475	1,091	583	359	6,782	7,298	13,195	1,371	918	143	66,111
June	41,482	16,538	24,944	5,198	377	1,149	582	632	7,352	6,654	14,779	1,369	704	124	63,864
July	50,531	18,772	31,759	4,201	270	1,358	728	797	7,367	8,580	16,534	1,310	913	166	73,983
Aug.	52,436	17,869	34,567	5,839	246	955	728	926	6,460	7,985	15,161	808	1,116	323	75,114
Sept.	49,607	15,146	34,461	5,111	125	1,027	727	611	5,868	9,164	15,005	1,702	656	274	74,731
Oct.	61,002	17,390	43,612	5,674	271	959	750	979	6,329	8,682	15,170	1,426	965	314	85,131
Nov.	54,599	20,142	34,457	6,097	516	1,020	750	1,303	6,684	9,951	14,474	1,553	956	366	78,127
Dec.	57,579	18,110	39,469	7,435	964	989	750	1,046	7,030	10,183	17,274	3,779	930	302	90,151
1934:															
Jan.	55,055	16,128	38,927	6,929	1,531	1,197	805	1,290	6,513	7,975	13,913	1,109	576	127	80,892
Feb.	57,867	15,027	42,840	8,620	775	1,005	805	1,264	6,706	9,211	13,696	1,232	831	105	87,090
March	58,515	19,907	38,608	6,750	1,412	1,360	806	1,363	8,655	10,539	19,084	1,968	846	113	91,504
April	56,748	20,957	35,791	5,157	762	1,447	894	1,311	7,282	9,808	19,250	1,330	440	236	83,708
May	69,403	25,691	43,712	8,870	1,106	1,892	1,397	997	12,104	14,606	26,598	1,243	726	328	113,579
June	53,282	20,981	32,301	5,397	1,425	1,886	644	1,497	4,860	6,192	15,956	1,593	765	377	72,893
July	53,335	22,829	30,506	3,818	710	1,662	1,048	2,399	5,762	7,369	14,415	1,703	353	252	69,997
Aug.	52,641	17,865	34,776	4,948	552	1,714	1,048	1,908	5,340	8,901	11,356	1,610	710	251	73,114
Sept.	61,051	17,889	43,162	6,555	294	1,438	839	1,626	5,722	10,738	14,688	1,665	764	222	87,713
Oct.	47,045	10,226	36,819	6,544	413	1,412	1,196	1,328	5,970	6,643	5,556	1,413	840	401	68,535
Nov.	51,140	8,759	42,381	6,756	501	953	941	1,356	7,621	7,123	5,338	2,356	1,017	200*	76,542
Dec.	59,575	15,375	44,200	8,481	990	1,237	680	2,043	10,865	12,953	12,354	2,956	1,035	200*	97,994
1935															
Jan.	56,720	17,142	39,578	6,268		1,630	1,222	2,614				2,650			

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, 2,439 in 1927, 1,437 in 1928, 2,670 in 1929, and 1,274 in 1930. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments were equivalent to 18 tons in 1923, 93 tons in 1924, 6 tons in 1925, 20 tons in 1926, about ½ ton in 1927, and 1 ton in 1928, and practically none in 1929, 1930 and 1931. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons in 1924, 2,239 tons in 1925, 44 tons in 1926, 84 tons in 1927, 1,459 tons in 1928, 1,302 tons in 1929, and 2,656 tons in 1930. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands, and includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. * Figure is provisional; final figure will be shown when available.

NOTE: THE FIGURES FOR 1933 ARE REVISED AS OF JANUARY 25, 1935 AND REPRESENT FINAL FIGURES

Net Imports of Crude Rubber into Principal Manufacturing Countries

(Long Tons)

	United States [1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	238,407	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	343,808
1920	249,530	56,844	13,88a	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,620
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	—3,807	1,778	589	567	396,222
1923	301,527	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,176	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,773	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,299	1,870	617,957
1927	403,472	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,846	36,49b	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,275	35,453	24,284	17,169	11,774	15,886	9,445	3,024	6,440	864	4,650	894,638
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,2b1	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	45,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1933	398,365	73,335	61,953	54,120	19,332	66,831	19,341	29,830	13,534	11,166	1,243	7,831	5,520	10,402	.....
1933:															
Sept.	43,886	4,341	4,111	5,841	2,620	5,369	2,055	2,168	794	864	189	604	790	577	74,211
Oct.	43,366	3,373	4,921	4,772	2,580	6,150	1,836	2,084	604	1,118	310	777	441	686	73,081
Nov.	39,633	3,955	5,419	4,086	2,184	6,296	942	4,483	301	1,129	222	878	493	882	70,903
Dec.	38,864	6,524	5,415	4,933	1,773	6,865	1,029	2,400	190	1,360	213	703	776	1,772	72,817
1934:															
Jan.	47,114	9,503	6,472	6,057	1,721	5,628	2,517	2,749	566	2,173	381	1,185	484	1,355	88,276
Feb.	33,087	10,785	5,301	5,490	1,854	4,570	2,388	3,399	950	1,538	287	464	656	516	73,357
Mar.	39,306	14,008	4,980	6,453	3,411	5,655	1,394	4,018	671	965	284	836	394	976	86,242
Apr.	42,262	9,999	3,210	6,701	2,419	5,679	1,966	1,326	415	504	262	1,217	752	465	77,177
May	47,412	9,786	3,634	6,499	2,218	6,905	2,218	4,360	769	214	322	940	147	1,768	87,192
June	46,785	16,564	3,803	6,171	2,208	6,745	1,887	3,145	1,512	837	331	843	1,146	1,624	93,601
July	40,308	12,266	4,051	5,494	2,430	5,739	708	1,640	732	810	540	1,602	747	1,094	78,161
Aug.	31,405	13,728	3,660	3,078	1,948	4,945	1,795	6,829	658	669	239	1,033	277	1,495	71,759
Sept.	30,345	11,254	4,244	2,607	2,770	7,346	1,486	4,487	743	501	339	980	465	477	68,044
Oct.	27,323	18,897	3,424	2,148	3,043	7,227	1,296	3,681	798	693	447	813	675	254	70,719
Nov.	35,982	15,875	3,176	3,425	1,568	5,580	1,764	4,488	516	379	187	1,382	542	215	75,079
Dec.	17,305	15,816	3,605	5,207	2,849	3,904			1,312	—168	139	1,143		762	
1935															
Jan.		20,383							1,099						

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1] United States imports of guayule are included in this compilation. * Figure is provisional; final figure will be shown immediately it becomes available.

A Section Devoted to Listings of Leading Producers and Distributors of Raw Materials, Machinery and Equipment, and Supplies for the Rubber Industry.

The Market Place

Chemicals and Compounding Materials — Machinery and Equipment—Crude, Reclaimed and Scrap Rubber—Fabrics—Rubber Products — Consulting Engineers.

Chemicals and Compounding Materials —

ACCELERATORS—
Ureka C—Ureka Blend B—Ureka.—A-1, A-7, A-11, A-16, A-19, A-32, Z-88, A-510, DPG
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SUPREME—*the up-to-date standard for rubber*
Imperial Oil & Gas Products Co.
Union Bank Bldg., Pittsburgh, Pa.

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Fine organic colors—Reds, Blues, Oranges, Violets, Greens—or any shade to meet your requirements—also Rubber Dispersed Colors
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A Section Devoted to Listings of Leading Producers and Distributors of Raw Materials, Machinery and Equipment, and Supplies for the Rubber Industry.

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A Section Devoted to Listings of Leading Producers and Distributors of Raw Materials, Machinery and Equipment, and Supplies for the Rubber Industry.

The Market Place

Chemicals and Compounding Materials — Machinery and Equipment—Crude, Reclaimed and Scrap Rubber—Fabrics—Rubber Products — Consulting Engineers.

Rubber — Crude, Scrap, Reclaimed, Latex

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